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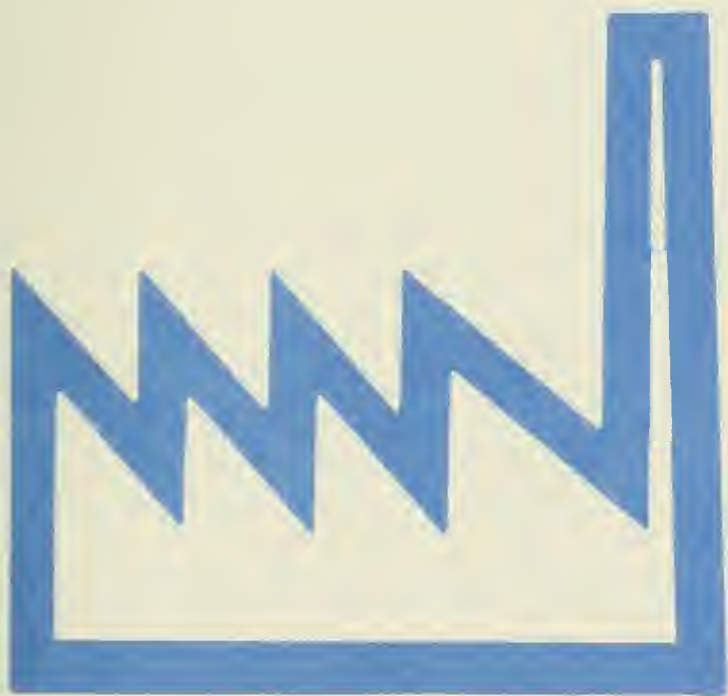
Census of Manufactures

MC87-I-32E

INDUSTRY SERIES

Abrasive, Asbestos, and Miscellaneous Nonmetallic Mineral Products

Industries 3291, 3292, 3295, 3296, 3297, and 3299



U.S. Department of Commerce
BUREAU OF THE CENSUS

Bureau of the Census

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The overall planning and review of the census operations were performed by the staff of the Office of the Assistant Director for Economic and Agriculture Censuses.

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If you have any questions concerning the statistics in this report, call (301) 763-7304.

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INTRODUCTION

PURPOSE AND USES OF THE ECONOMIC CENSUSES

The economic censuses are the major source of facts about the structure and functioning of the Nation's economy. They provide essential information for government, business, industry, and the general public.

Economic censuses furnish an important part of the framework for such composite measures as the gross national product, input-output measures, production and price indexes, and other statistical series that measure short-term changes in economic conditions.

Policy-making agencies of the Federal Government use the data, especially in monitoring economic activity and providing assistance to business.

State and local governments use the data to assess business activities and tax bases within their jurisdictions and to develop programs to attract business.

Trade associations study trends in their own and competing industries, and keep their members informed of market changes.

Individual businesses use the data to locate potential markets and to analyze their own production and sales performance relative to industry or area averages.

AUTHORITY AND SCOPE

Title 13 of the United States Code (sections 131, 191, and 224) directs the Census Bureau to take the economic censuses every 5 years, covering years ending in 2 and 7. The 1987 Economic Censuses consist of the

- Census of Retail Trade
- Census of Wholesale Trade
- Census of Service Industries
- Census of Transportation
- Census of Manufactures
- Census of Mineral Industries
- Census of Construction Industries

Special programs also cover enterprise statistics and minority-owned and women-owned businesses. (The 1987 Census of Agriculture and 1987 Census of Governments are conducted separately.) The next economic censuses are scheduled to be taken in 1993 covering the year 1992.

AVAILABILITY OF THE DATA

The results of each of the economic censuses are available in printed reports, for sale by the U.S. Government Printing Office, and on microfiche, computer tape, compact discs with read-only memory, and flexible diskettes, for sale by the Census Bureau. Order forms for all types of products are available on request from Customer Services, Census Bureau, Washington, DC 20233. A more complete description of publications being issued from this census is on the inside back cover of this document.

Census facts are also widely disseminated by trade associations, business journals, and newspapers. Volumes containing census statistics are available in most major public and college libraries. Finally, State Data Centers in every State and Business and Industry Data Centers in many States also supply economic census statistics.

WHAT'S NEW IN 1987

Several changes have taken place for the 1987 censuses. Data will be reported on the basis of the newly revised Standard Industrial Classification (SIC) system with selected reports including "bridge tables," linking the old and new classification systems. A new set of metropolitan areas has been adopted, and more detailed information will be available for businesses with no paid employees. For additional information on these changes, review the subsequent text.

HISTORICAL INFORMATION

The economic censuses have been taken together as an integrated program at 5-year intervals since 1967, and before that for 1963, 1958, and 1954. Prior to that time, the individual censuses were taken separately at varying intervals.

The economic censuses trace their beginnings to the 1810 Decennial Census, when questions on manufacturing were included with those for population. Coverage of economic activities was expanded for 1840 and subsequent censuses to include mining and some commercial

activities. In 1902, Congress established a permanent Census Bureau and directed that a census of manufactures be taken every 5 years. The 1905 manufactures census was the first time a census was taken apart from the regular every-10-year population census.

The first census of business was taken in 1930, covering 1929. Initially it covered retail and wholesale trade, and construction industries, but it was broadened in 1933 to include some of the service trades.

The 1954 economic censuses were the first to be fully integrated—providing comparable census data across economic sectors, using consistent time periods, concepts, definitions, classifications, and reporting units. These were the first censuses to be taken by mail, using lists of firms provided by the administrative records of other federal agencies. Since 1963, administrative records have also been used to provide basic statistics as well for very small firms, reducing or eliminating the need to send them census questionnaires. The Enterprise Statistics Program, which publishes combined data from the economic censuses, was made possible with the implementation of the integrated census program in 1954.

The range of industries covered in the economic censuses has continued to expand. The Census of Construction Industries began on a regular basis in 1967, and the scope of service industries was broadened in 1967, 1977, and 1987. The Census of Transportation began in 1963 as a set of surveys covering travel, transportation of commodities, and trucks. New for 1987 are publications reporting on business establishments engaged in several transportation industries, paralleling the data on establishments in other sectors. This is part of a gradual expansion in coverage of industries previously subjected to government regulation. The Survey of Minority-Owned Business Enterprises was first conducted as a special project in 1969 and was incorporated into the economic censuses in 1972 along with the Survey of Women-Owned Businesses.

Economic censuses have also been taken in Puerto Rico since 1909, in the Virgin Islands and Guam since 1958, and in the Northern Mariana Islands since 1982.

Statistical reports from the 1982 and earlier censuses provide historical figures for the study of long-term time series, and are available in some large libraries. All of the census data published since 1967 are still available for sale on microfiche from the Census Bureau.

AVAILABILITY OF MORE FREQUENT ECONOMIC DATA

While the censuses provide complete enumerations every 5 years, there are many needs for more frequent data as well. The Census Bureau conducts a number of monthly, quarterly, and annual surveys, the results of which appear in publication series such as *Current Business Reports* (retail and wholesale trade and service industries), the *Annual Survey of Manufactures*, *Current Industrial Reports*, and the *Quarterly Financial Report*. Most of these surveys, while providing more frequent

observations, yield less kind-of-business and geographic detail than the censuses. The *County Business Patterns* program offers annual statistics on the number of establishments, employment, and payroll classified by industry within each county.

SOURCES FOR MORE INFORMATION

More information about the scope, coverage, classification system, data items, and publications for each of the economic censuses and related surveys is published in the *Guide to the 1987 Economic Censuses and Related Statistics*. More information on the methodology, procedures, and history of the censuses will be published in the *History of the 1987 Economic Censuses*. Contact Customer Services for information on availability.

CENSUS OF MANUFACTURES

General

This report, from the 1987 Census of Manufactures, is one of a series of 83 industry reports, each of which provides statistics for individual industries or groups of related industries. Additional separate reports will be issued for each State and the District of Columbia and for special subjects such as type of organization, distribution of sales by class of customer, concentration ratios and water use in manufacturing.

The industry reports include such statistics as number of establishments, employment, payroll, value added by manufacture, cost of materials consumed, capital expenditures, product shipments, etc.

State reports present similar statistics for each State and its important metropolitan statistical areas (MSA's), counties, and places. Selected statistical totals for "all manufacturing" have been shown in the State reports for MSA's with 250 employees or more and for counties and places with 450 employees or more.

The *General Summary* report will contain industry, product class, and geographic area statistics summarized in one report. The introduction to the *General Summary* discusses, at greater length, many of the subjects described in this introduction. For example, the *General Summary* text will discuss the relationship of value added by manufacture to National income by industry of origin, the changes in statistical concepts over the history of the censuses, and the valuation problems arising from intracompany transfers between manufacturing plants of a company and between manufacturing plants and sales offices and sales branches of a company.

Scope of Census and Definition of Manufacturing

The 1987 Census of Manufactures covers all establishments with one paid employee or more primarily engaged in manufacturing as defined in the *1987 Standard Industrial*

*Classification (SIC) Manual*¹. This is the system of industrial classification developed by experts on classification in Government and private industry under the guidance of the Office of Information and Regulatory Affairs, Office of Management and Budget. This classification system is used by Government agencies as well as many organizations outside the Government.

The SIC Manual defines manufacturing as the mechanical or chemical transformation of substances or materials into new products. The assembly of component parts of products also is considered to be manufacturing if the resulting product is neither a structure nor other fixed improvement. These activities are usually carried on in plants, factories, or mills that characteristically use power-driven machines and materials-handling equipment.

Manufacturing production is usually carried on for the wholesale market, for transfers to other plants of the same company, or to the order of industrial users rather than for direct sale to the household consumer. Some manufacturers in a few industries sell chiefly at retail to household consumers through the mail, through house-to-house routes, or through salespersons. Some activities of a service nature (enameling, engraving, etc.) are included in manufacturing when they are performed primarily for trade. They are considered nonmanufacturing when they are performed primarily to the order of the household consumer.

Relationship Between Annual Survey of Manufactures and Census of Manufactures

The Bureau of the Census conducts the annual survey of manufactures (ASM) in each of the 4 years between the censuses of manufactures. The ASM is a probability-based sample of approximately 56,000 establishments and collects the same industry statistics (employment, payroll, value of shipments, etc.) as the census of manufactures. In addition to collecting the information normally requested on the census form, the establishments in the ASM sample are requested to supply information on assets, capital expenditures, retirements, depreciation, rental payments, supplemental labor costs, costs of purchased services, and foreign content of materials consumed. Except for supplemental labor costs, the extra ASM items are collected only in census years.

Establishment Basis of Reporting

The census of manufactures is conducted on an establishment basis. A company operating at more than one location is required to file a separate report for each location. The ASM also is conducted on an establishment basis, but separate reports are filed for just those establishments selected in the sample. Companies engaged in

distinctly different lines of activity at one location are requested to submit separate reports if the plant records permit such a separation and if the activities are substantial in size.

In 1987, as in earlier years, a minimum size limit was set for inclusion of establishments in the census. All establishments employing one person or more at any time during the census year are included. The same size limitation has applied since 1947 in censuses and annual surveys of manufactures. In the 1939 and earlier censuses, establishments with less than \$5,000 value of products were excluded. The change in the minimum size limit in 1947 does not appreciably affect the historical comparability of the census figures except for data on number of establishments for a few industries. This report excludes information for separately operated administrative offices, warehouses, garages, and other auxiliary units that service manufacturing establishments of the same company (see Auxiliaries).

Manufacturing Universe and Census Report Forms

The 1987 Census of Manufactures universe includes approximately 350,000 establishments. The amounts of information requested from manufacturing establishments were dependent upon a number of factors. The more important considerations were the size of the company and whether it was included in the annual survey of manufactures. The methods of obtaining information for the various subsets of the universe to arrive at the aggregate figures shown in the publication are described below:

1. Small Single-Establishment Companies Not Sent a Report Form

In the 1987 Census of Manufactures, approximately 150,000 small single-establishment companies were excused from filing reports. Selection of these small establishments was done on an industry-by-industry basis and was based on annual payroll and total shipments data as well as on the industry classification codes contained in the administrative records of Federal agencies. The cutoffs were selected so that these administrative-records cases would account for no more than 3 percent of the value of shipments for all manufacturing. Generally, all single-establishment companies with less than five employees were excused, while all establishments with more than 20 employees were mailed forms.

Information on the physical location of the establishment, as well as information on payrolls, receipts (shipments), and industry classification, was obtained from the administrative records of other Federal agencies under special arrangements, which safeguarded their confidentiality. Estimates of data for these small establishments were developed using industry averages in conjunction with the administrative information. The value of shipments and cost of materials

¹Standard Industrial Classification Manual: 1987: For sale by Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, Stock No. 041-001-00314-2.

were not distributed among specific products and materials for these establishments but were included in the product and material "not specified by kind" (n.s.k.) categories.

The industry classification codes included in the administrative-records files were assigned on the basis of brief descriptions of the general activity of the establishment. As a result, an indeterminate number of establishments were erroneously coded at the four-digit SIC level. This was especially true whenever there was a relatively fine line of demarcation between industries or between manufacturing and nonmanufacturing activity.

Sometimes these administrative-record cases were only given a two- or three-digit SIC group. For the 1987 Census of Manufactures, these establishments were sent a separate classification form, which requested information on the products and services of the establishment. This form was used to code many of these establishments to the four-digit SIC level. Establishments that did not return the classification form were coded later to those four-digit SIC industries identified as "not elsewhere classified" (n.e.c.) within the given two- or three-digit industry groups.

As a result of these situations, a number of small establishments may have been misclassified by industry. However, such possible misclassification has no significant effect on the statistics other than on the number of companies and establishments.

The total establishment count for individual industries should be viewed as an approximation rather than a precise measurement. The counts for establishments with 20 employees or more are far more reliable than the count of total number of establishments.

2. Establishments Sent a Report Form

The 200,000 establishments covered in the mail canvass were divided into three groups:

- a. **ASM sample establishments**—This group consisted of approximately 56,000 establishments covering all the units of large manufacturing establishments as well as a sample of the medium and smaller establishments. The probability of selection was proportionate to size (see appendix, Annual Survey of Manufactures).

In a census of manufactures year, the ASM report form (MA-1000) replaces the first page of the regular census form for those establishments included in the ASM. In addition to information on employment, payroll, and other items normally requested on the regular census form, establishments in the ASM sample were requested to supply information on assets, capital expenditures, retirements, depreciation, rental payments, supplemental labor costs, and costs of purchased services. See appendix A, section 2, for an explanation of these items.

The census part of the report form is one of approximately 200 versions containing product, material, and special inquiries. The diversity of manufacturing activities necessitated the use of these many forms to canvass the 459 manufacturing industries. Each form was developed for a group of related industries.

Appearing on each form was a list of products primary to the group of related industries as well as secondary products and miscellaneous services that establishments classified in these industries were likely to be performing. Respondents were requested to identify the products, the value of each product, and, in a large number of cases, the quantity of the product shipped during the survey year. Space also was provided for the respondent to describe products not specifically identified on the form.

The report form also contained a materials-consumed inquiry, which varied from form to form depending on the industries being canvassed. The respondents were asked to review a list of materials generally used in their production processes. From this list, each establishment was requested to identify those materials consumed during the survey year, the cost of each, and, in certain cases, the quantity consumed. Once again, space was provided for the respondent to describe significant material not identified on the form.

Finally, a wide variety of special inquiries was included to measure activities peculiar to a given industry, such as operations performed and equipment used.

- b. **Large and medium establishments (non-ASM)**—Approximately 84,000 establishments were included in this group. A variable cutoff, based on administrative-records payroll data and determined on an industry-by-industry basis, was used to select those establishments that were to receive one of the approximately 200 census of manufactures regular forms. The first page, requesting establishment data for items such as employment and payroll, was standard but did not contain the detailed statistics included on the ASM form. The product, material, and special inquiry sections supplied were based on the historical industry classification of the establishment.
- c. **Small single-establishment companies (non-ASM)**—This group consisted of approximately 60,000 establishments. For those industries where application of the variable cutoff for administrative-records cases resulted in a large number of small establishments being included in the mail canvass, an abbreviated or "short" form was used. These establishments received one of the approximately 80 versions of the short form, which requested

summary product and material data and totals but no details on employment, payrolls, cost of materials, inventories, and capital expenditures.

Use of the short form has no adverse effect on published totals for the industry statistics; the same data were collected on the short form as on the long form. However, detailed information on materials consumed was not collected on the short form; thus its use would increase the value of the n.s.k. categories.

Auxiliaries

In this industry report, the data on employment and payroll are limited to operating manufacturing establishments. The census report form filed for auxiliaries (ES-9200) requested a description of the activity of the establishments serviced. However, the manufacturing auxiliaries were coded only to the two-digit major group of the establishments they served; whereas, the operating establishments were coded to a four-digit manufacturing industry. Data for the approximately 10,000 separately operated auxiliaries are included in the geographic area series and in a report issued as part of the 1987 Enterprise Statistics Survey.

Auxiliaries are establishments whose employees are primarily engaged in performing supporting services for other establishments of the same company, rather than for the general public or for other business firms. They can be at different locations from the establishments served or at the same location as one of those establishments but not operating as an integral part thereof and serving two establishments or more. Where auxiliary operations are conducted at the same location as the manufacturing operation and operate as an integral part thereof, they usually are included in the report for the operating manufacturing establishment.

Included in the broad category of auxiliaries are administrative offices. Employees in administrative offices are concerned with the general management of multiestablishment companies, i.e., with the general supervision and control of two units or more, such as manufacturing plants, mines, sales branches, or stores. The functions of these employees may include (1) program planning, including sales research and coordination of purchasing, production, and distribution; (2) company purchasing, including general contracts and purchasing methods; (3) company financial policy and accounting; (4) general engineering, including design of product machinery and equipment, and direction of engineering effort conducted at the individual operation locations; (5) direction of company personnel matters; and (6) legal and patent matters.

Other types of auxiliaries serving the plants or central management of the company include purchasing offices, sales promotion offices, research and development organizations, etc.

Industry Classification of Establishments

Each of the establishments covered in the census was classified in 1 of 459 manufacturing industries in accordance with the industry definitions in the 1987 SIC Manual. The 1987 edition of this manual represents a major revision for manufacturing industries from the 1972 edition and its 1977 supplement. Appendix A of the 1987 Manual notes the revisions in the four-digit industry levels between 1972/77 and 1987.

An industry is generally defined as a group of establishments producing the same product or a closely related group of products. The product groupings from which industry classifications are derived are based on considerations such as similarity of manufacturing processes, types of materials used, types of customers, and the like. The resulting group of establishments must be significant in terms of number, value added by manufacture, value of shipments, and number of employees. The system operates in such a way that the definitions progressively become narrower with successive additions of numerical digits. For 1987, there are 20 major groups (two-digit SIC), 139 industry groups (three-digit SIC), and 459 industries (four-digit SIC). This represents an expansion of four-digit industries from 452 in 1972/77 and a reduction of three-digit groups from 143 in 1972/77. Product classes and products of the manufacturing industries have been assigned codes based on the industry from which they originate. There are about 11,000 products identified by a seven-digit code. The seven-digit products are considered the primary products of the industry with the same four digits.

Accordingly, an establishment is usually classified in a particular industry on the basis of its major activity during a particular year, i.e., production of the products primary to that industry exceeds, in value, production of the products primary to any other single industry. In a few instances, however, the industry classification of an establishment is not only determined by the products it makes but also by the process employed in operations. Refining of nonferrous metals from ore or rolling and drawing of nonferrous metals (processes which involve heavy capitalization in specialized equipment) would be classified according to the process used during a census year. These establishments then would be "frozen" in that industry during the following ASM years.

In either a census or ASM year, establishments included in the ASM sample with certainty weight, other than those involved with heavily capitalized activities described above, are reclassified by industry only if the change in the primary activity from the prior year is significant or the change has occurred for 2 successive years. This procedure prevents reclassification when there are minor shifts in product mix.

In ASM years, establishments included in the ASM sample with noncertainty weight are not shifted from one industry classification to another. They are retained in the industry where they were classified in the base census year (see appendix, Annual Survey of Manufactures).

However, in the following census year, these ASM plants are allowed to shift from one industry to another.

The result of these rules covering the switching of plants from one industry classification to another is that, at the aggregate level, some industries comprise different mixes of establishments between survey years, and establishment data for such industry statistics as employment and payroll may be tabulated in different industries between survey years. Hence, comparisons between prior-year and current-year published totals, particularly at the four-digit SIC level, should be viewed with caution. This is particularly true for the comparison between the data shown for a census year versus the data shown for the previous ASM year.

As previously noted, the small establishments that may have been misclassified by industry are usually administrative-record cases whose industry codes were assigned on the basis of incomplete descriptions of the general activity of the establishment. Such possible misclassifications have no significant effect on the statistics other than on the number of companies and establishments.

While some establishments produce only the primary products of the industry in which they are classified, all establishments of an industry rarely specialize to this extent. The industry statistics (employment, inventories, value added by manufacture, total value of shipments including resales and miscellaneous receipts, etc.) shown in tables 1a through 5a, therefore, reflect not only the primary activities of the establishments in that industry but also their secondary activities. The product statistics in table 6a represent the output of all establishments whether or not they are classified in the same industry as the product. For this reason, in relating the industry statistics, especially the value of shipments to the product statistics, the composition of the industry's output shown in table 5b should be considered.

The extent to which industry and product statistics may be matched with each other is measured by two ratios which are computed from the figures shown in table 5b. The first of these ratios, called the primary product specialization ratio, measures the proportion of product shipments (both primary and secondary) of the establishments classified in the industry represented by the primary products of those establishments. The second ratio, called the coverage ratio, is the proportion of primary products shipped by the establishments classified in the industry to total shipments of such products by all manufacturing establishments.

However, establishments making products falling into the same industry category may use a variety of processes and materials to produce them. Also, the same industry classification (based on end products) may include both establishments that are highly integrated and those that put only the finishing touches on an already highly fabricated item. For example, the refrigeration equipment industry includes instances of almost complete integration (production of the compressor, condensing unit, electric motor, casting, stamping of the case, and final assembly) all

carried on at one plant. On the other hand, the condensing unit, the motor, and the case may be purchased and only assembled into the finished product.

In some instances, separate industry categories have been established for integrated and nonintegrated establishments. For other industries, the census provides separate statistics on the production of intermediate commodities made and used in the producing plant. For some industries characterized by many plants of the same company, separate figures on interplant transfers of products usually are shown.

Differences in the integration of production processes, types of operations, and alternatives in types of materials used should be considered when relating the industry statistics (employment, payrolls, value added, etc.) to the product and material data.

Value of Shipments for the Industry Compared With Value of Product Shipments

This report shows value of shipments data for industries and products. In tables 1a through 5a, these data represent the total value of shipments of all establishments classified in a particular industry. The data include the shipments of the products classified in the industry (primary to the industry), products classified in other industries (secondary to the industry), and miscellaneous receipts (repair work, sale of scrap, research and development, installation receipts, and resales). Value of product shipments shown in table 6a represents the total value of all products shipped that are classified as primary to an industry.

CENSUS DISCLOSURE RULES

In accordance with Federal law governing census reports, no data are published that would disclose the data for an individual establishment or company. However, the number of establishments classified in a specific industry is not considered a disclosure, so this information may be released even though other information is withheld.

The disclosure analysis for the industry statistics in tables 1a through 5a of this report is based on the total value of shipments. When the total value of shipments cannot be shown without disclosing information for individual companies, the complete line is suppressed. However, the suppressed data are included in higher-level totals. Additional disclosure analysis is performed for new capital expenditures that can be suppressed even though value of shipments data are publishable.

SPECIAL TABULATIONS

Special tabulations of data collected in the 1987 Census of Manufactures may be obtained on computer tape or in tabular form. The data will be in summary form and subject to the same rules prohibiting disclosure of confidential

information (including name, address, kind of business, or other data for individual business establishments or companies) as are the regular publications.

Special tabulations are prepared on a cost basis. A request for a cost estimate, as well as exact specifications on the type and format of the data to be provided, should be directed to the Chief, Industry Division, Bureau of the Census, Washington, DC 20233.

ABBREVIATIONS AND SYMBOLS

The following abbreviations and symbols are used in this publication:

-	Represents zero.
(D)	Withheld to avoid disclosing data for individual companies; data are included in higher level totals.
(NA)	Not available.
(NC)	Not comparable.
(S)	Withheld because estimate did not meet publication standards.
(X)	Not applicable.
(Z)	Less than half the unit shown.
do	Ditto.

n.e.c.	Not elsewhere classified.
n.s.k.	Not specified by kind.
pt.	Part.
r	Revised.
SIC	Standard Industrial Classification.

Other abbreviations, such as lb, gal, yd, doz, bbl, and s tons, are used in the customary sense.

CONTACTS FOR DATA USERS

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Census/ASM		
Durables	Kenneth Hansen	(301) 763-7304
Nondurables	Michael Zampogna	(301) 763-2510
Current Industrial Reports		
Durables	Malcolm Bernhardt	(301) 763-2518
Nondurables	Thomas Flood	(301) 763-5911
Import/Export Publications	Foreign Trade Division	(301) 763-5140
Industry Analysis and Forecasts	International Trade Administration	(202) 377-4356

Users' Guide for Locating Statistics in This Report by Table Number

For explanation of terms, see appendixes

Item	Four-digit industry statistics							Five-digit product class and seven-digit product statistics			
	Historical	Operating ratios	By geographic area	Summary and supplemental	By employment size	By industry and product class specialization	Materials consumed by kind	Industry-product analysis	Product shipments	Product class by geographic area	Historical product class
Number of companies	1a			3a					*6a		
Number of establishments....	1a		2	3a	4	5a					
Employment and payroll:											
Number of employees	1a	1b	2	3a	4	5a					
Payroll	1a	1b	2	3a	4	5a					
Supplemental labor costs ...				3a							
Production workers	1a	1b	2	3a	4	5a					
Production- worker hours. ...	1a	1b	2	3a	4	5a					
Production- worker wages...	1a	1b	2	3a	4	5a					
Shipments, cost of materials, and value added:											
Value of shipments (four-digit)	1a	1b	2	3a	4	5a		5b			
Product class shipments (five-digits)									6a	6b	6c
Product shipments (seven-digit)									6a		
Value added by manufacture	1a	1b	2	3a	4	5a					
Cost of materials	1a	1b	2	3a	4	5a					
Fuels and electric energy ...				3a							
Materials consumed by kind .							7				
Inventories:											
Total, end of year	1a			3a	4						
By stage of fabrication				3a							
Capital expenditures, assets, rental payments, and purchased services:											
New capital expenditures....	1a		2	3b	4	5a					
Used plant and equipment expenditures.....				3b							
Gross assets				3b							
Depreciation				3b							
Retirements of buildings and machinery				3b							
Rental payments				3b							
Foreign content of materials consumed				3c							
Purchased services				3c							
Ratios:											
Specialization	1a			3a				5b			
Coverage	1a			3a				5b			

*Number of companies with shipments of more than \$100 thousand.

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Abrasive, Asbestos, and Miscellaneous Nonmetallic Mineral Products

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DESCRIPTION OF INDUSTRIES AND SUMMARY OF FINDINGS

This report shows 1987 Census of Manufactures statistics for establishments classified in each of the following industries:

SIC code and title

3291	Abrasive Products
3292	Asbestos Products
3295	Minerals, Ground or Treated
3296	Mineral Wool
3297	Nonclay Refractories
3299	Nonmetallic Mineral Products, N.E.C.

The industry statistics (employment, payroll, cost of materials, value of shipments, inventories, etc.) are reported for each establishment as a whole. Aggregates of such data for an industry reflect not only the primary activities of the establishments but also their activities in the manufacture of secondary products as well as their miscellaneous activities (contract work on materials owned by others, repair work, etc.). This fact should be taken into account when comparing industry statistics (tables 1 through 5a) with product statistics (table 6) showing shipments by all industries of the primary products of the specified industry. The extent of the "product mix" is indicated in table 5b, which shows the value of primary and secondary products shipped by establishments classified in the specified industry and the value of primary products of the industry shipped as secondary products by establishments classified in other industries.

Small single-establishment companies with up to 20 employees (cutoff varied by industry) were excluded from the mail portion of the census. For these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated), data on payrolls and receipts were obtained from administrative records of other Federal agencies. The remaining statistics were developed from industry averages.

Establishment data were tabulated based on industry definitions included in the 1987 Standard Industrial Classification (SIC) Manual¹. The 1987 edition represents a major revision for manufacturing industries from the 1972 edition and its 1977 supplement. In addition to the 1987 SIC revision, changes were made to the product class (five-digit) and product code (seven-digit) categories. The

product class and product code comparability between the 1987 and 1982 censuses is shown in the appendixes. These appendixes present, in tabular form, the linkage from 1987 to 1982.

All dollar figures included in this report are at prices current for the year specified and, therefore, unadjusted for changes in price levels. Consequently, when making comparisons to prior years, users should take into consideration the inflation that has occurred.

INDUSTRY 3291, ABRASIVE PRODUCTS

This industry is made up of establishments primarily engaged in manufacturing abrasive grinding wheels of natural or synthetic materials, abrasive-coated products, and other abrasive products. The cutting of grindstones, pulpstones, and whetstones at the quarry is classified in Division B, Mining.

The 1987 definition of this industry is the same as that used in the 1972/7 Standard Industrial Classification (SIC) system. The SIC number and title also are the same.

In the 1987 Census of Manufactures, Industry 3291, Abrasive Products, had employment of 23.4 thousand. The employment figure was 10 percent below the 26.0 thousand reported in 1982. The leading States in employment in 1987 were Massachusetts, New York, Ohio, and Minnesota, accounting for 55 percent of the industry's employment. These same States were the leaders in 1982, when they accounted for approximately 60 percent of the industry's employment.

The total value of shipments for establishments classified in this industry was \$3.6 billion.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous receipts, such as resales and contract receipts. Industry 3291 shipped \$2.7 billion of abrasive products considered primary to the industry, \$582.3 million of secondary products, and had \$347.7 million of miscellaneous receipts, resales, and contract work. Thus, the ratio of primary products to the total of both secondary and primary products shipped by establishments in the industry was 82 percent (specialization ratio). In 1982, the specialization ratio was 83 percent.

Establishments in this industry also accounted for 94 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio). In 1982, the coverage ratio was 95 percent. The products primary to industry 3291, no matter in what industry they

¹Standard Industrial Classification Manual: 1987. For sale by Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Stock No. 041-001-00314-2.

were produced, appear in table 6a and aggregate to \$2.9 billion. For further explanation of specialization and coverage ratios, see table 5b and the appendixes.

The total cost of materials, services, and fuels and electric energy used by establishments classified in the abrasive products industry amounted to \$1.7 billion. Data on specific materials consumed appear in table 7.

Single-establishment companies in this industry with up to 20 employees were excluded from the mail portion of the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were obtained from administrative records of other agencies or developed from industry averages. These establishments accounted for 9 percent of total value of shipments.

INDUSTRY 3292, ASBESTOS PRODUCTS

This industry is made up of establishments primarily engaged in manufacturing asbestos textiles, asbestos building materials, except asbestos paper, insulating materials for covering boilers and pipes, and other products composed wholly or chiefly of asbestos. Establishments primarily engaged in manufacturing asbestos paper are classified in industry 2621, and those manufacturing gas-kets and packing are classified in industry 3053.

The 1987 definition of this industry is the same as that used in the 1972/7 Standard Industrial Classification (SIC) system. The SIC number and title also are the same. However, product class 32927 now includes 1972 SIC-based product classes 32928 and 32929.

In the 1987 Census of Manufactures, Industry 3292, Asbestos Products, had employment of 4.0 thousand. The employment figure was 59 percent below the 9.7 thousand reported in 1982. Compared with 1986, employment decreased 22 percent. The 1986 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses. The leading States in employment in 1987 were Virginia, Pennsylvania, Tennessee, and New York, accounting for 73 percent of the industry's employment. This represents a shift from 1982 when Pennsylvania, Texas, New York, and New Jersey accounted for approximately 50 percent of the industry's employment.

The total value of shipments for establishments classified in this industry was \$386.5 million.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous receipts, such as resales and contract receipts. Industry 3292 shipped \$346.9 million of asbestos products considered primary to the industry, \$21.1 million of secondary products, and had \$18.5 million of miscellaneous receipts, resales, and contract work. Thus, the ratio of primary products to the total of both secondary and primary products shipped by establishments in the industry was 94 percent (specialization ratio). In 1982, the specialization ratio was 92 percent.

Establishments in this industry also accounted for 89 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio). In 1982, the coverage ratio was 91 percent. The products primary to industry 3292, no matter in what industry they were produced, appear in table 6a and aggregate to \$389.7 million. For further explanation of specialization and coverage ratios, see table 5b and the appendixes.

The total cost of materials, services, and fuels and electric energy used by establishments classified in the asbestos products industry amounted to \$185.2 million. Data on specific materials consumed appear in table 7.

Single-establishment companies in this industry with up to 20 employees were excluded from the mail portion of the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were obtained from administrative records of other agencies or developed from industry averages. These establishments accounted for 9 percent of total value of shipments.

INDUSTRY 3295, MINERALS, GROUND OR TREATED

This industry is made up of establishments operating without a mine or quarry and primarily engaged in crushing, grinding, pulverizing, or otherwise preparing clay ceramic and refractory minerals; barite; and miscellaneous nonmetallic minerals, except fuels. These minerals are the crude products mined by establishments of industry groups 145 and 149, and by those of industry 1479 mining barite. Also included are establishments primarily crushing slag and preparing roofing granules. The beneficiation or preparation of other minerals and metallic ores, and the cleaning and grading of coal, are classified in Division B, Mining, whether or not the operation is associated with a mine.

The 1987 definition of this industry is the same as that used in the 1972/7 Standard Industrial Classification (SIC) system. The SIC number and title also are the same.

In the 1987 Census of Manufactures, Industry 3295, Minerals, Ground or Treated, had employment of 8.8 thousand. The employment figure was 12 percent below the 10.0 thousand reported in 1982. The leading States in 1987 were Georgia, Pennsylvania, California, and Ohio. This represents a shift from 1982 when California, Pennsylvania, Texas, and Arkansas were the leading States.

The total value of shipments for establishments classified in this industry was \$1.4 billion.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous receipts, such as resales and contract receipts. Industry 3295 shipped \$1.3 billion of minerals, ground or treated, products considered primary to the industry, \$60.0 million of secondary products, and had \$62.4 million of miscellaneous receipts, resales, and contract work. Thus, the ratio

of primary products to the total of both secondary and primary products shipped by establishments in the industry was 96 percent (specialization ratio). In 1982, the specialization ratio was 98 percent.

Establishments in this industry also accounted for 95 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio). In 1982, the coverage ratio was 93 percent. The products primary to industry 3295, no matter in what industry they were produced, appear in table 6a and aggregate to \$1.3 billion. For further explanation of specialization and coverage ratios, see table 5b and the appendixes.

The total cost of materials, services, and fuels and electric energy used by establishments classified in the minerals, ground or treated, industry amounted to \$563.9 million. Data on specific materials consumed appear in table 7.

Single-establishment companies in this industry with up to 20 employees were excluded from the mail portion of the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were obtained from administrative records of other agencies or developed from industry averages. These establishments accounted for 9 percent of total value of shipments.

INDUSTRY 3296, MINERAL WOOL

This industry is made up of establishments primarily engaged in manufacturing mineral wool and mineral wool insulation products made of such siliceous materials as rock, slag, and glass, or combination thereof. Establishments primarily engaged in manufacturing asbestos insulation products are classified in industry 3292, and those manufacturing textile glass fibers are classified in industry 3229.

The 1987 definition of this industry is the same as that used in the 1972/7 Standard Industrial Classification (SIC) system. The SIC number and title also are the same. However, product class 32961 now includes 1972 SIC-based product classes 32963 and 32964, and product class 32962 now includes 1972 SIC-based product classes 32965 and 32966.

In the 1987 Census of Manufactures, Industry 3296, Mineral Wool, had employment of 21.5 thousand. The employment figure was 9 percent above the 19.7 thousand reported in 1982. The leading States in employment in 1987 were Ohio, Georgia, California, and Pennsylvania. This represents a shift from 1982 when Ohio, New Jersey, Kansas, and California were the leading States.

The total value of shipments for establishments classified in this industry was \$3.3 billion.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous receipts, such as resales and contract receipts. Industry

3296 shipped \$3.1 billion of mineral wool products considered primary to the industry, \$126.1 million of secondary products, and had \$63.3 million of miscellaneous receipts, resales, and contract work. Thus, the ratio of primary products to the total of both secondary and primary products shipped by establishments in the industry was 96 percent (specialization ratio). In 1982, the specialization ratio was 97 percent.

Establishments in this industry also accounted for 98 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio). In 1982, the coverage ratio was 97 percent. The products primary to industry 3296, no matter in what industry they were produced, appear in table 6a and aggregate to \$3.1 billion. For further explanation of specialization and coverage ratios, see table 5b and the appendixes.

The total cost of materials, services, and fuels and electric energy used by establishments classified in the mineral wool industry amounted to \$1.3 billion. Data on specific materials consumed appear in table 7.

Single-establishment companies in this industry with up to 20 employees were excluded from the mail portion of the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were obtained from administrative records of other agencies or developed from industry averages. These establishments accounted for 5 percent of total value of shipments.

INDUSTRY 3297, NONCLAY REFRACTORIES

This industry is made up of establishments primarily engaged in manufacturing refractories and crucibles made of materials other than clay. This industry includes establishments primarily engaged in manufacturing all graphite refractories, whether of carbon bond or ceramic bond. Establishments primarily engaged in manufacturing clay refractories are classified in industry 3255. Products of this industry also are collected in the Current Industrial Report MA-32C, Refractories.

The 1987 definition of this industry is the same as that used in the 1972/7 Standard Industrial Classification (SIC) system. The SIC number and title also are the same.

In the 1987 Census of Manufactures, Industry 3297, Nonclay Refractories, had employment of 7.7 thousand. The employment figure was 13 percent above the 6.8 thousand reported in 1982. Compared with 1986, employment increased 20 percent. The 1986 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses. The leading States in employment in 1987 were Ohio, Pennsylvania, New York, and Michigan, accounting for 57 percent of the industry's employment. This represents a shift from 1982 when Ohio, Pennsylvania, New York, and Maryland accounted for 65 percent of the industry's employment.

The total value of shipments for establishments classified in this industry was \$954.5 million.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous receipts, such as resales and contract receipts. Industry 3297 shipped \$829.5 million of nonclay refractory products considered primary to the industry, \$87.7 million of secondary products, and had \$37.3 million of miscellaneous receipts, resales, and contract work. Thus, the ratio of primary products to the total of both secondary and primary products shipped by establishments in the industry was 90 percent (specialization ratio). In 1982, the specialization ratio was 86 percent.

Establishments in this industry also accounted for 85 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio). In 1982, the coverage ratio was 82 percent. The products primary to industry 3297, no matter in what industry they were produced, appear in table 6a and aggregate to \$972.4 million. For further explanation of specialization and coverage ratios, see table 5b and the appendixes.

The total cost of materials, services, and fuels and electric energy used by establishments classified in the nonclay refractories industry amounted to \$443.5 million. Data on specific materials consumed appear in table 7.

Single-establishment companies in this industry with up to 20 employees were excluded from the mail portion of the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were obtained from administrative records of other agencies or developed from industry averages. These establishments accounted for between 10 and 19 percent of total value of shipments.

INDUSTRY 3299, NONMETALLIC MINERAL PRODUCTS, N.E.C.

This industry is made up of establishments primarily engaged in the factory production of goods made of plaster of paris and papier mache, and in manufacturing sand lime products and other nonmetallic mineral products, not elsewhere classified.

The 1987 definition of this industry is the same as that used in the 1972/7 Standard Industrial Classification (SIC) system. The SIC number and title also are the same.

In the 1987 Census of Manufactures, Industry 3299, Nonmetallic Mineral Products, N.E.C., had employment of 7.6 thousand. The employment figure was 17 percent above the 6.5 thousand reported in 1982. The leading States in employment in 1987 were California, Texas, Ohio, and New York, accounting for 39 percent of the industry's employment. This represents a shift from 1982 when New York, California, Ohio, and Pennsylvania accounted for approximately 40 percent of the industry's employment.

The total value of shipments for establishments classified in this industry was \$597.1 million.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous receipts, such as resales and contract receipts. Industry 3299 shipped \$520.1 million of nonmetallic mineral products, not elsewhere classified, products considered primary to the industry, \$56.2 million of secondary products, and had \$20.8 million of miscellaneous receipts, resales, and contract work. Thus, the ratio of primary products to the total of both secondary and primary products shipped by establishments in the industry was 90 percent (specialization ratio). In 1982, the specialization ratio was 95 percent.

Establishments in this industry also accounted for 87 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio). In 1982, the coverage ratio also was 87 percent. The products primary to industry 3299, no matter in what industry they were produced, appear in table 6a and aggregate to \$597.6 million. For further explanation of specialization and coverage ratios, see table 5b and the appendixes.

The total cost of materials, services, and fuels and electric energy used by establishments classified in the nonmetallic mineral products, n.e.c., industry amounted to \$248.4 million. Data on specific materials consumed appear in table 7.

Single-establishment companies in this industry with up to 20 employees were excluded from the mail portion of the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were obtained from administrative records of other agencies or developed from industry averages. These establishments accounted for 27 percent of total value of shipments.

Table 1a. Historical Statistics for the Industry: 1987 and Earlier Years

[1987 industry definitions are the same as in the 1972/77 Standard Industrial Classification (SIC) system. Excludes data for auxiliaries. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Year ¹	All establishments ³			All employees		Production workers			Value added by manufacture ⁴ (million dollars)	Cost of materials ⁵ (million dollars)	Value of shipments (million dollars)	New capital expenditures ⁶ (million dollars)	End-of-year inventories ⁴ (million dollars)	Ratios	
	Companies ² (no.)	Total (no.)	With 20 employees or more (no.)	Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)						Specialization ⁷ (per- cent)	Coverage ⁸ (per- cent)
	INDUSTRY 3291, ABRASIVE PRODUCTS														
1987 Census ---	360	405	178	23.4	624.2	15.5	31.2	349.9	2 001.2	1 656.3	3 621.4	113.5	596.7	82	94
1986 ASM-----	(NA)	(NA)	(NA)	24.8	607.6	16.7	33.5	338.3	1 738.9	1 640.5	3 383.5	95.2	540.3	(NA)	(NA)
1985 ASM-----	(NA)	(NA)	(NA)	25.5	604.4	17.1	33.2	337.8	1 833.0	1 805.0	3 675.3	143.1	545.1	(NA)	(NA)
1984 ASM-----	(NA)	(NA)	(NA)	26.0	594.7	17.5	34.8	336.7	1 943.2	1 879.7	3 781.8	137.8	612.1	(NA)	(NA)
1983 ASM-----	(NA)	(NA)	(NA)	24.8	535.4	16.5	31.6	305.2	1 698.6	1 482.1	3 195.9	78.3	536.9	(NA)	(NA)
1982 Census ---	326	374	177	26.0	531.8	17.0	31.6	305.1	1 451.8	1 277.2	2 750.7	96.9	563.1	83	95
1981 ASM-----	(NA)	(NA)	(NA)	31.3	588.3	21.1	40.9	351.1	1 592.7	1 539.4	3 104.4	81.9	527.3	(NA)	(NA)
1980 ASM-----	(NA)	(NA)	(NA)	31.0	523.6	21.0	40.4	305.8	1 462.3	1 336.8	2 769.6	123.4	464.0	(NA)	(NA)
1979 ASM-----	(NA)	(NA)	(NA)	32.4	506.3	23.0	43.7	313.1	1 378.5	1 303.6	2 614.0	95.0	441.2	(NA)	(NA)
1978 ASM-----	(NA)	(NA)	(NA)	30.4	454.8	21.6	41.6	289.8	1 197.5	1 071.2	2 198.1	61.7	367.5	(NA)	(NA)
1977 Census ---	353	410	178	28.3	392.3	20.1	38.5	241.2	1 097.7	914.4	1 955.8	48.7	317.7	90	97
1976 ASM-----	(NA)	(NA)	(NA)	24.7	311.5	17.9	35.0	194.2	788.4	671.8	1 432.9	44.6	221.3	(NA)	(NA)
1975 ASM-----	(NA)	(NA)	(NA)	24.4	278.7	17.3	33.3	167.5	679.2	544.6	1 222.2	44.0	190.3	(NA)	(NA)
1974 ASM-----	(NA)	(NA)	(NA)	27.3	287.7	20.2	39.2	185.3	683.4	561.3	1 235.2	44.9	190.8	(NA)	(NA)
1973 ASM-----	(NA)	(NA)	(NA)	26.8	266.0	19.0	37.3	166.6	630.1	450.7	1 069.7	24.8	181.9	(NA)	(NA)
1972 Census ---	335	392	167	24.5	229.4	17.2	33.1	138.1	529.6	361.6	888.1	17.2	147.9	93	88
	INDUSTRY 3292, ASBESTOS PRODUCTS														
1987 Census ---	50	54	22	4.0	98.7	3.1	6.3	70.3	202.6	185.2	386.5	14.9	49.6	94	89
1986 ASM-----	(NA)	(NA)	(NA)	5.1	121.8	3.9	7.6	82.8	260.6	219.5	485.9	23.6	74.0	(NA)	(NA)
1985 ASM-----	(NA)	(NA)	(NA)	6.8	152.9	5.2	10.5	105.5	318.4	280.3	607.5	24.1	114.1	(NA)	(NA)
1984 ASM-----	(NA)	(NA)	(NA)	7.1	156.2	5.5	11.1	110.2	345.8	304.2	641.8	21.1	127.8	(NA)	(NA)
1983 ASM-----	(NA)	(NA)	(NA)	8.6	173.7	6.7	13.5	119.2	385.5	376.0	750.0	21.2	134.8	(NA)	(NA)
1982 Census ---	77	96	53	9.7	179.8	7.4	14.6	126.6	397.4	429.3	842.8	31.3	148.0	92	91
1981 ASM-----	(NA)	(NA)	(NA)	9.6	191.2	7.6	15.4	136.1	466.0	440.4	890.2	33.7	161.5	(NA)	(NA)
1980 ASM-----	(NA)	(NA)	(NA)	9.7	177.7	7.9	16.0	128.1	421.6	454.6	877.1	33.6	151.9	(NA)	(NA)
1979 ASM-----	(NA)	(NA)	(NA)	12.2	208.8	10.1	20.8	155.7	510.5	516.8	1 024.4	46.6	182.2	(NA)	(NA)
1978 ASM-----	(NA)	(NA)	(NA)	14.2	204.3	11.4	23.6	157.0	491.8	496.4	974.9	36.2	177.8	(NA)	(NA)
1977 Census ---	86	123	76	13.9	179.9	11.0	22.6	137.4	439.3	448.7	882.1	26.0	168.0	92	81
1976 ASM-----	(NA)	(NA)	(NA)	16.6	193.1	13.0	26.7	145.0	512.1	484.1	988.5	20.1	182.8	(NA)	(NA)
1975 ASM-----	(NA)	(NA)	(NA)	17.3	189.5	13.5	26.9	139.7	461.0	437.6	900.1	23.1	171.1	(NA)	(NA)
1974 ASM-----	(NA)	(NA)	(NA)	21.0	219.3	16.9	35.3	168.4	489.9	492.7	963.1	32.4	183.6	(NA)	(NA)
1973 ASM-----	(NA)	(NA)	(NA)	21.3	204.6	17.1	35.6	155.2	442.0	382.4	823.6	29.3	150.5	(NA)	(NA)
1972 Census ---	87	142	97	21.0	191.0	16.6	34.5	142.8	426.1	343.5	763.4	20.4	136.3	91	88
	INDUSTRY 3295, MINERALS, GROUND OR TREATED														
1987 Census ---	245	381	108	8.8	218.4	6.4	12.9	149.8	834.4	563.9	1 406.2	53.2	190.7	96	95
1986 ASM-----	(NA)	(NA)	(NA)	8.2	201.6	6.0	11.6	128.8	731.3	510.7	1 261.4	54.3	150.5	(NA)	(NA)
1985 ASM-----	(NA)	(NA)	(NA)	7.8	183.5	5.6	11.0	115.1	676.3	490.2	1 170.5	72.0	164.1	(NA)	(NA)
1984 ASM-----	(NA)	(NA)	(NA)	8.8	187.7	6.4	12.8	118.9	680.0	585.3	1 259.0	48.9	174.9	(NA)	(NA)
1983 ASM-----	(NA)	(NA)	(NA)	10.7	225.7	8.0	16.3	155.0	723.8	696.0	1 423.6	947.9	225.7	(NA)	(NA)
1982 Census ---	279	437	143	10.0	190.3	7.5	14.4	129.6	639.4	627.8	1 269.9	75.0	193.8	98	93
1981 ASM-----	(NA)	(NA)	(NA)	11.3	191.6	9.2	18.4	140.8	691.4	601.9	1 282.9	98.4	149.9	(NA)	(NA)
1980 ASM-----	(NA)	(NA)	(NA)	11.0	172.8	9.2	19.4	131.2	667.1	575.6	1 224.6	104.2	127.7	(NA)	(NA)
1979 ASM-----	(NA)	(NA)	(NA)	13.7	230.6	11.3	24.0	175.2	744.8	621.9	1 357.2	78.0	131.8	(NA)	(NA)
1978 ASM-----	(NA)	(NA)	(NA)	11.9	179.9	9.3	19.4	129.3	620.2	584.6	1 197.5	70.6	140.5	(NA)	(NA)
1977 Census ---	318	466	151	11.5	156.3	8.9	18.1	111.8	479.4	480.6	957.3	50.2	116.3	96	90
1976 ASM-----	(NA)	(NA)	(NA)	12.4	144.0	10.0	19.9	101.7	496.3	381.4	878.5	77.9	105.2	(NA)	(NA)
1975 ASM-----	(NA)	(NA)	(NA)	11.6	126.5	9.3	19.1	91.0	379.1	285.0	660.0	65.8	86.4	(NA)	(NA)
1974 ASM-----	(NA)	(NA)	(NA)	11.8	117.1	9.5	20.1	85.4	316.1	291.3	597.8	50.2	68.8	(NA)	(NA)
1973 ASM-----	(NA)	(NA)	(NA)	10.7	101.7	8.4	17.7	77.9	283.2	198.2	461.6	35.1	45.9	(NA)	(NA)
1972 Census ---	349	488	152	9.5	87.9	7.6	16.2	64.6	237.2	177.3	414.4	30.0	40.3	95	89
	INDUSTRY 3296, MINERAL WOOL														
1987 Census ---	173	231	109	21.5	619.4	17.4	36.6	483.6	1 985.6	1 268.8	3 260.3	177.6	242.5	96	98
1986 ASM-----	(NA)	(NA)	(NA)	21.9	624.2	17.7	36.8	481.6	2 021.5	1 300.9	3 314.7	160.9	244.0	(NA)	(NA)
1985 ASM-----	(NA)	(NA)	(NA)	21.3	583.1	17.0	35.8	447.2	1 823.0	1 277.9	3 100.6	161.7	229.9	(NA)	(NA)
1984 ASM-----	(NA)	(NA)	(NA)	21.4	542.8	17.3	36.5	419.3	1 733.6	1 241.1	2 964.4	131.1	217.8	(NA)	(NA)
1983 ASM-----	(NA)	(NA)	(NA)	19.5	476.2	15.6	32.9	364.6	1 440.7	1 082.0	2 517.6	56.4	194.4	(NA)	(NA)
1982 Census ---	130	179	94	19.7	438.9	15.5	31.9	334.2	1 236.7	1 041.5	2 281.1	67.0	180.1	97	97
1981 ASM-----	(NA)	(NA)	(NA)	21.8	448.9	17.0	35.2	344.4	1 245.1	1 106.7	2 338.6	91.4	201.3	(NA)	(NA)
1980 ASM-----	(NA)	(NA)	(NA)	22.0	418.4	17.7	37.2	323.0	1 215.5	1 031.8	2 235.4	109.2	186.0	(NA)	(NA)
1979 ASM-----	(NA)	(NA)	(NA)	24.1	412.2	19.6	40.8	323.9	1 221.4	962.3	2 180.1	116.3	172.0	(NA)	(NA)
1978 ASM-----	(NA)	(NA)	(NA)	24.1	371.2	19.7	41.1	289.0	1 161.6	874.6	2 019.1	209.4	149.3	(NA)	(NA)
1977 Census ---	95	153	90	22.6	313.8	18.6	38.3	244.5	1 053.7	738.6	1 790.5	85.9	121.5	93	96
1976 ASM-----	(NA)	(NA)	(NA)	20.3	263.2	16.6	34.5	206.2	767.5	628.4	1 389.7	35.0	115.3	(NA)	(NA)
1975 ASM-----	(NA)	(NA)	(NA)	18.1	210.2	14.5	29.5	160.4	617.0	528.0	1 145.5	81.0	100.4	(NA)	(NA)
1974 ASM-----	(NA)	(NA)	(NA)	19.5	218.7	16.0	33.7	171.4	596.8	468.1	1 059.8	102.6	86.2	(NA)	(NA)
1973 ASM-----	(NA)	(NA)	(NA)	18.7	194.0	15.5	32.5	152.5	521.5	351.1	868.9	58.5	67.6	(NA)	(NA)
1972 Census ---	66	108	75	18.0	172.3	14.7	30.8	135.7	441.5	315.6	755.4	50.1	54.9	93	93
	INDUSTRY 3297, NONCLAY REFRACTORIES														
1987 Census ---	99	135	79	7.7	201.6	5.6	11.2	130.3	td						

See footnotes at end of table.

Table 1a. Historical Statistics for the Industry: 1987 and Earlier Years—Con.

[1987 industry definitions are the same as in the 1972/77 Standard Industrial Classification (SIC) system. Excludes data for auxiliaries. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Year ¹	Com- panies ² (no.)	All establishments ³		All employees		Production workers			Value added by manufac- ture ⁴ (million dollars)	Cost of materials ⁵ (million dollars)	Value of shipments (million dollars)	New capital expend- itures ⁶ (million dollars)	End-of- year inven- tories ⁴ (million dollars)	Ratios		
		Total (no.)	With 20 employ- ees or more (no.)	Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)						Spe- ciali- zation ⁷ (per- cent)	Cover- age ⁸ (per- cent)	
	INDUSTRY 3297, NONCLAY REFRACTORIES—Con.															
1977 Census ---	74	109	66	9.1	134.3	6.8	13.5	92.5	352.1	336.4	680.2	37.1	159.5	92	83	
1976 ASM -----	(NA)	(NA)	(NA)	9.0	122.8	6.7	13.3	85.3	329.4	316.7	643.0	25.6	152.2	(NA)	(NA)	
1975 ASM -----	(NA)	(NA)	(NA)	8.9	111.8	6.5	13.1	77.4	287.3	275.8	564.9	29.2	137.2	(NA)	(NA)	
1974 ASM -----	(NA)	(NA)	(NA)	10.9	122.7	8.5	17.5	90.1	335.9	286.9	609.2	24.8	132.6	(NA)	(NA)	
1973 ASM -----	(NA)	(NA)	(NA)	9.2	96.3	7.1	14.8	69.3	249.1	203.7	445.0	16.5	92.0	(NA)	(NA)	
1972 Census ---	60	90	60	8.1	78.3	6.0	12.8	54.5	191.1	151.1	342.1	9.3	81.6	94	84	
	INDUSTRY 3299, NONMETALLIC MINERAL PRODUCTS, N.E.C.															
1987 Census ---	534	543	89	7.6	134.6	5.7	10.8	84.9	351.8	248.4	597.1	13.0	86.4	90	87	
1986 ASM -----	(NA)	(NA)	(NA)	8.0	152.9	6.1	12.4	106.8	420.1	209.7	626.2	24.0	94.6	(NA)	(NA)	
1985 ASM -----	(NA)	(NA)	(NA)	9.1	153.6	7.1	14.0	108.8	395.2	218.2	606.9	33.0	97.6	(NA)	(NA)	
1984 ASM -----	(NA)	(NA)	(NA)	8.0	124.0	6.1	12.3	85.3	373.5	217.5	582.3	28.2	77.2	(NA)	(NA)	
1983 ASM -----	(NA)	(NA)	(NA)	4.4	84.8	3.7	7.8	63.9	232.9	166.0	392.3	⁹ 23.5	62.8	(NA)	(NA)	
1982 Census ---	569	583	67	6.5	94.5	4.8	10.0	63.9	240.3	177.7	422.3	38.3	60.6	95	87	
1981 ASM -----	(NA)	(NA)	(NA)	9.6	124.3	7.2	15.4	83.4	304.2	197.6	500.7	25.3	40.4	(NA)	(NA)	
1980 ASM -----	(NA)	(NA)	(NA)	9.7	122.6	7.2	15.1	78.4	331.8	219.8	536.1	127.3	61.7	(NA)	(NA)	
1979 ASM -----	(NA)	(NA)	(NA)	9.9	121.3	7.8	15.3	88.5	320.8	191.8	508.0	31.4	43.8	(NA)	(NA)	
1978 ASM -----	(NA)	(NA)	(NA)	8.0	95.5	6.4	12.7	63.0	266.4	169.4	434.8	36.8	45.0	(NA)	(NA)	
1977 Census ---	681	696	70	7.7	87.2	6.2	11.4	59.1	224.1	166.6	387.3	28.7	46.9	93	89	
1976 ASM -----	(NA)	(NA)	(NA)	7.8	79.8	6.3	11.7	56.4	196.6	128.0	325.3	31.0	36.4	(NA)	(NA)	
1975 ASM -----	(NA)	(NA)	(NA)	6.9	64.4	5.5	10.8	43.2	135.6	112.2	253.9	18.4	29.9	(NA)	(NA)	
1974 ASM -----	(NA)	(NA)	(NA)	7.8	61.4	6.3	12.2	44.3	144.3	92.9	230.9	11.0	31.0	(NA)	(NA)	
1973 ASM -----	(NA)	(NA)	(NA)	7.1	53.6	6.0	11.1	37.5	133.5	73.1	200.2	9.0	18.0	(NA)	(NA)	
1972 Census ---	480	491	81	6.3	46.0	5.2	9.9	31.9	104.7	58.7	166.5	5.0	16.1	94	90	

¹In annual survey of manufactures (ASM) years, data are estimates based on a representative sample of establishments canvassed annually and may differ from results of a complete canvass of all establishments. ASM publication shows percentage standard errors. Unless otherwise noted, for data prior to 1972, see 1972 Census of Manufactures, vol. II, table 1a of the Industry chapter.

²For the Census, a company is defined as a business organization consisting of one establishment or more under common ownership or control.

³Includes establishments with payroll at any time during year.

⁴Beginning with the 1982 Census of Manufactures, all respondents were requested to report their inventories at (the lower of) cost or market prior to adjustment to LIFO cost. This is a change from prior Censuses and annual surveys of manufactures in which respondents were permitted to value their inventories using any generally accepted accounting method. Consequently, inventories and value added by manufacture are not comparable to prior-year data.

⁵Detailed data on materials consumed by type are shown in table 7.

⁶Detailed data on new machinery and equipment expenditures are provided in table 3c.

⁷Represents ratio of primary product shipments to total product shipments (primary and secondary, excluding miscellaneous receipts) for establishments classified in the industry.

⁸Represents ratio of primary products shipped by establishments classified in industry to total shipments of such products by all manufacturing establishments, wherever classified.

⁹Estimates for new capital expenditures have associated standard error of 15 percent or more and may be of limited reliability. Estimates for other data items are of acceptable reliability.

Table 1b. Selected Operating Ratios for the Industry: 1987 and Earlier Years

[1987 industry definitions are the same as in the 1972/77 Standard Industrial Classification (SIC) system. Excludes data for auxiliaries. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Year	Payroll per employee (dollars)	Production workers as percent of total employment (percent)	Annual hours of production workers (number)	Average hourly earnings of production workers (dollars)	Cost of materials as percent of value of shipments (percent)	Cost of materials and payroll as percent of value of shipments (percent)	Value added per employee (dollars)	Payroll as percent of value added (percent)	Value added per production worker hour (dollars)
INDUSTRY 3291, ABRASIVE PRODUCTS									
1987 Census	26 675	66	2 013	11.21	46	63	85 521	31	64.14
1986 ASM	24 500	67	2 006	10.10	48	66	70 117	35	51.91
1985 ASM	23 701	67	1 942	10.17	49	66	71 882	33	55.21
1984 ASM	22 873	67	1 989	9.68	50	65	74 738	31	55.84
1983 ASM	21 588	67	1 915	9.66	46	63	68 492	32	53.75
1982 Census	20 453	65	1 859	9.66	46	66	55 838	37	45.94
1981 ASM	18 795	67	1 938	8.58	50	69	50 885	37	38.94
1980 ASM	16 890	68	1 924	7.57	48	67	47 171	36	36.20
1979 ASM	15 626	71	1 900	7.16	50	69	42 546	37	31.54
1978 ASM	14 960	71	1 926	6.97	49	69	39 391	38	28.79
1977 Census	13 862	71	1 915	6.26	47	67	38 788	36	28.51
1976 ASM	12 611	72	1 955	5.55	47	69	31 919	40	22.53
1975 ASM	11 422	71	1 925	5.03	45	67	27 836	41	20.40
1974 ASM	10 538	74	1 941	4.73	45	69	25 033	42	17.43
1973 ASM	9 925	71	1 963	4.47	42	67	23 511	42	16.89
1972 Census	9 363	70	1 924	4.17	41	67	21 616	43	16.00
INDUSTRY 3292, ASBESTOS PRODUCTS									
1987 Census	24 675	77	2 032	11.16	48	73	50 650	49	32.16
1986 ASM	23 882	76	1 949	10.89	45	70	51 098	47	34.29
1985 ASM	22 485	76	2 019	10.05	46	71	46 824	48	30.32
1984 ASM	22 000	77	2 018	9.93	47	72	48 704	45	31.15
1983 ASM	20 197	78	2 015	8.83	50	73	44 826	45	28.56
1982 Census	18 536	76	1 973	8.67	51	72	40 969	45	27.22
1981 ASM	19 916	79	2 026	8.84	49	71	48 542	41	30.26
1980 ASM	18 319	81	2 025	8.01	52	72	43 464	42	26.35
1979 ASM	17 114	83	2 059	7.49	50	71	41 844	41	24.54
1978 ASM	14 387	80	2 070	6.65	51	72	34 634	42	20.84

See footnotes at end of table.

Table 1b. Selected Operating Ratios for the Industry: 1987 and Earlier Years—Con.

[1987 industry definitions are the same as in the 1972/77 Standard Industrial Classification (SIC) system. Excludes data for auxiliaries. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Year	Payroll per employee (dollars)	Production workers as percent of total employment (percent)	Annual hours of production workers (number)	Average hourly earnings of production workers (dollars)	Cost of materials as percent of value of shipments (percent)	Cost of materials and payroll as percent of value of shipments (percent)	Value added per employee (dollars)	Payroll as percent of value added (percent)	Value added per production worker hour (dollars)
INDUSTRY 3292, ASBESTOS PRODUCTS—Con.									
1977 Census.....	12 942	79	2 055	6.08	51	71	31 604	41	19.44
1976 ASM.....	11 632	78	2 054	5.43	49	69	30 849	38	19.18
1975 ASM.....	10 953	78	1 993	5.19	49	70	26 647	41	17.14
1974 ASM.....	10 442	80	2 089	4.77	51	74	23 329	45	13.88
1973 ASM.....	9 605	80	2 082	4.36	46	71	20 751	46	12.42
1972 Census.....	9 095	79	2 078	4.14	45	70	20 290	45	12.35
INDUSTRY 3295, MINERALS, GROUND OR TREATED									
1987 Census.....	24 835	73	2 024	11.59	40	56	94 899	26	64.68
1986 ASM.....	24 585	73	1 933	11.10	40	56	89 183	28	63.04
1985 ASM.....	23 525	72	1 964	10.46	42	58	86 705	27	61.48
1984 ASM.....	21 329	73	2 000	9.29	46	61	77 273	28	53.13
1983 ASM.....	21 093	75	2 038	9.51	49	65	67 645	31	44.40
1982 Census.....	19 030	75	1 920	9.00	49	64	63 940	30	44.40
1981 ASM.....	16 955	81	2 000	7.65	47	62	61 186	28	37.58
1980 ASM.....	15 709	84	2 109	6.76	47	61	60 645	26	34.39
1979 ASM.....	16 832	82	2 124	7.30	46	63	54 365	31	31.03
1978 ASM.....	15 117	78	2 086	6.66	49	64	52 118	29	31.97
1977 Census.....	13 591	77	2 034	6.18	50	67	41 687	33	26.49
1976 ASM.....	11 612	81	1 990	5.11	43	60	40 024	29	24.94
1975 ASM.....	10 905	80	2 054	4.76	43	62	32 681	33	19.85
1974 ASM.....	9 923	81	2 116	4.25	49	68	26 788	37	15.73
1973 ASM.....	9 504	79	2 107	4.40	43	65	26 467	36	16.00
1972 Census.....	9 252	80	2 132	3.99	43	64	24 968	37	14.64
INDUSTRY 3296, MINERAL WOOL									
1987 Census.....	28 809	81	2 103	13.21	39	58	92 353	31	54.25
1986 ASM.....	28 502	81	2 079	13.09	39	58	92 306	31	54.93
1985 ASM.....	27 375	80	2 106	12.49	41	60	85 587	32	50.92
1984 ASM.....	25 364	81	2 110	11.49	42	60	81 009	31	47.50
1983 ASM.....	24 420	80	2 109	11.08	43	62	73 882	33	43.79
1982 Census.....	22 279	79	2 058	10.48	46	65	62 777	35	38.77
1981 ASM.....	20 591	78	2 071	9.78	47	67	57 115	36	35.37
1980 ASM.....	19 018	80	2 102	8.68	46	65	55 250	34	32.67
1979 ASM.....	17 103	81	2 082	7.94	44	63	50 680	34	29.94
1978 ASM.....	15 402	82	2 086	7.03	43	62	48 199	32	28.26
1977 Census.....	13 884	82	2 059	6.38	41	59	46 624	30	27.51
1976 ASM.....	12 965	82	2 078	5.98	45	64	37 808	34	22.25
1975 ASM.....	11 613	80	2 034	5.44	46	64	34 088	34	20.92
1974 ASM.....	11 215	82	2 106	5.09	44	65	30 605	37	17.71
1973 ASM.....	10 374	83	2 097	4.69	40	63	27 888	37	16.05
1972 Census.....	9 572	82	2 095	4.41	42	65	24 528	39	14.33
INDUSTRY 3297, NONCLAY REFRACTORIES									
1987 Census.....	26 182	73	2 000	11.63	46	68	66 351	39	45.62
1986 ASM.....	25 421	72	1 978	11.29	48	70	62 375	41	43.87
1985 ASM.....	24 126	71	1 956	11.27	49	69	59 857	40	42.85
1984 ASM.....	22 692	74	1 896	10.49	49	71	55 585	41	39.70
1983 ASM.....	23 125	73	1 878	11.01	53	75	51 482	45	37.44
1982 Census.....	21 823	68	1 891	10.69	50	71	48 985	45	38.29
1981 ASM.....	20 468	71	1 912	10.02	47	67	57 948	35	42.79
1980 ASM.....	18 288	72	1 943	8.82	49	68	50 402	36	35.95
1979 ASM.....	16 747	74	1 974	8.05	46	65	50 573	33	34.73
1978 ASM.....	15 495	76	1 963	7.36	50	69	42 276	37	28.27
1977 Census.....	14 758	75	1 985	6.85	49	69	38 692	38	26.08
1976 ASM.....	13 644	74	1 985	6.41	49	68	36 600	37	24.77
1975 ASM.....	12 561	73	2 015	5.91	49	69	32 281	39	21.93
1974 ASM.....	11 256	78	2 059	5.15	47	67	30 817	37	19.19
1973 ASM.....	10 467	77	2 085	4.68	46	67	27 076	39	16.83
1972 Census.....	9 666	74	2 133	4.26	44	67	23 593	41	14.93
INDUSTRY 3299, NONMETALLIC MINERAL PRODUCTS, N.E.C.									
1987 Census.....	17 711	75	1 895	7.86	42	64	46 289	38	32.57
1986 ASM.....	19 112	76	2 033	8.61	33	58	52 513	36	33.88
1985 ASM.....	16 879	78	1 972	7.77	36	61	43 429	39	28.23
1984 ASM.....	15 500	76	2 016	6.93	37	59	46 688	33	30.37
1983 ASM.....	19 272	84	2 108	8.19	42	64	52 932	36	29.86
1982 Census.....	14 538	74	2 083	6.39	42	64	36 969	39	24.03
1981 ASM.....	12 947	75	2 139	5.42	39	64	31 688	41	19.75
1980 ASM.....	12 639	74	2 097	5.19	41	64	34 206	37	21.97
1979 ASM.....	12 252	79	1 962	5.78	38	62	32 404	38	20.97
1978 ASM.....	11 937	80	1 984	4.96	39	61	33 300	36	20.98
1977 Census.....	11 324	81	1 839	5.18	43	66	29 104	39	19.66
1976 ASM.....	10 230	81	1 857	4.82	39	64	25 205	41	16.80
1975 ASM.....	9 333	80	1 964	4.00	44	70	19 652	47	12.56
1974 ASM.....	7 871	81	1 937	3.63	40	67	18 500	43	11.83
1973 ASM.....	7 549	85	1 850	3.38	37	63	18 803	40	12.03
1972 Census.....	7 301	83	1 904	3.22	35	63	16 619	44	10.58

Note: For qualifications of data, see footnotes on table 1a.

Table 2. Industry Statistics for Selected States: 1987 and 1982

[Excludes data for auxiliaries. States with 150 employees or more are shown. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry and geographic area	1987												1982	
	E ¹	All establishments		All employees		Production workers			Value added by manufacture (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	All employees ² (1,000)	Value added by manufacture (million dollars)
		Total (no.)	With 20 employees or more (no.)	Number ² (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)						
INDUSTRY 3291, ABRASIVE PRODUCTS														
United States	-	405	178	23.4	624.2	15.5	31.2	349.9	2 001.2	1 656.3	3 621.4	113.5	26.0	1 451.8
California	E3	40	14	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	1.0	48.9
Connecticut	-	10	6	.4	11.8	.2	.5	5.1	23.7	19.7	42.4	(D)	.4	20.7
Georgia	-	7	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
Illinois	E1	36	22	2.0	52.1	1.3	2.8	25.9	148.9	90.8	238.6	(D)	1.8	96.1
Indiana	E2	10	4	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.2	8.9
Iowa	-	2	1	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
Massachusetts	-	31	16	FF	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	5.9	212.4
Michigan	E2	46	18	1.0	23.5	.7	1.4	14.3	73.8	53.3	127.2	(D)	1.2	50.0
Minnesota	-	6	3	FF	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	FF	(D)
Missouri	-	3	2	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
New Jersey	E7	22	13	.5	11.0	.3	.6	5.9	28.1	24.7	52.6	.8	.5	21.5
New York	-	40	15	2.9	76.7	1.9	3.7	43.8	156.7	168.8	331.7	8.2	4.3	163.0
North Carolina	E2	15	7	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.3	10.1
Ohio	E1	38	19	2.7	75.6	1.9	3.9	40.2	173.6	128.5	294.5	8.0	3.2	200.3
Pennsylvania	E2	29	12	.7	17.3	.5	.9	9.9	43.5	41.1	85.5	1.6	1.0	38.0
Texas	-	19	5	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.6	41.8
Virginia	-	4	3	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
Washington	E1	6	2	.2	3.8	.1	.3	2.8	9.5	4.8	13.8	(D)	.3	7.6
Wisconsin	-	8	2	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
INDUSTRY 3292, ASBESTOS PRODUCTS														
United States	-	54	22	4.0	98.7	3.1	6.3	70.3	202.6	185.2	386.5	14.9	9.7	397.4
California	E1	10	3	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
New Jersey	E1	2	1	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.8	48.5
New York	-	2	2	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
North Carolina	-	3	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.6	26.7
Pennsylvania	-	7	5	.8	19.9	.6	1.3	13.0	32.5	31.9	64.2	1.3	2.0	98.0
Tennessee	-	2	2	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
Texas	E6	9	4	.2	3.3	.1	.2	2.2	6.7	7.7	15.5	.4	1.0	49.8
Virginia	-	2	2	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
INDUSTRY 3295, MINERALS, GROUND OR TREATED														
United States	-	381	108	8.8	218.4	6.4	12.9	149.8	834.4	563.9	1 406.2	53.2	10.0	639.4
Arkansas	E2	7	3	.2	4.1	.1	.3	2.4	19.4	8.9	28.5	(D)	.5	58.0
California	-	30	8	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	1.3	105.0
Colorado	E2	13	3	.2	4.2	.2	.3	2.7	15.0	6.6	21.4	.5	.2	12.7
Florida	E1	12	5	.3	5.9	.2	.4	3.9	26.8	20.2	47.2	.8	.3	17.7
Georgia	-	12	7	1.0	24.6	.7	1.4	16.8	88.3	48.6	144.4	15.6	.3	14.6
Illinois	-	19	9	.5	12.4	.3	.7	7.6	34.7	36.5	70.6	(D)	.4	19.9
Indiana	-	11	6	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.3	15.6
Louisiana	-	12	3	.3	6.5	.2	.4	4.3	21.3	31.4	54.2	.8	.5	38.8
Michigan	-	8	3	.4	13.0	.3	.7	10.7	59.6	47.4	106.6	(D)	.2	13.1
Missouri	-	8	5	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.4	21.0
New Jersey	E1	15	5	.3	6.7	.2	.4	4.1	29.1	21.6	51.3	.7	.5	27.2
New York	-	9	1	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.3	18.8
Ohio	-	31	6	.5	12.8	.4	.8	8.3	44.5	35.7	80.6	2.7	.4	22.8
Pennsylvania	-	28	10	.9	20.4	.7	1.3	15.9	64.4	40.0	103.9	2.2	.8	44.9
South Carolina	-	8	6	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.2	6.7
Tennessee	E4	10	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.2	7.4
Texas	E1	37	5	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.6	43.1
West Virginia	-	7	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.3	14.7
Wisconsin	-	7	2	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
INDUSTRY 3296, MINERAL WOOL														
United States	-	231	109	21.5	619.4	17.4	36.6	483.6	1 985.6	1 268.8	3 260.3	177.6	19.7	1 236.7
Alabama	-	8	5	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.5	23.9
California	-	21	10	2.0	58.3	1.5	3.4	45.6	198.8	146.6	347.0	6.2	1.8	144.2
Delaware	-	1	1	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Florida	-	8	3	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Georgia	-	13	6	2.3	69.5	1.8	3.8	52.5	265.3	144.5	412.5	18.1	1.3	122.7
Illinois	E1	11	4	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.4	14.6
Indiana	-	11	10	1.8	48.1	1.4	2.8	34.0	142.7	99.8	242.9	(D)	1.4	78.3
Kansas	-	3	3	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	1.9	158.0
Kentucky	-	4	3	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Massachusetts	E3	5	4	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Michigan	-	7	4	.6	13.5	.5	1.1	10.5	30.8	37.7	68.6	(D)	.4	11.3
Minnesota	-	5	4	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Mississippi	-	3	2	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
New Jersey	-	7	3	1.1	33.5	.9	1.7	27.2	109.9	54.1	166.0	4.5	2.2	126.7
New York	E1	8	3	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)

See footnotes at end of table.

Table 2. Industry Statistics for Selected States: 1987 and 1982—Con.

[Excludes data for auxiliaries. States with 150 employees or more are shown. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry and geographic area	E ¹	1987										1982		
		All establishments		All employees		Production workers			Value added by manufacture (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	All employees ² (1,000)	Value added by manufacture (million dollars)
		Total (no.)	With 20 employees or more (no.)	Number ² (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)						
INDUSTRY 3296, MINERAL WOOL—Con.														
North Carolina	E1	7	3	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Ohio	-	20	12	FF	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	3.5	209.2
Pennsylvania	-	20	10	1.9	52.3	1.6	3.2	41.9	172.3	102.9	274.2	15.1	1.5	81.6
Texas	-	24	9	1.3	40.3	1.1	2.3	32.5	135.3	93.4	226.8	8.7	1.2	82.3
West Virginia	-	1	1	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
Wisconsin	-	5	2	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
INDUSTRY 3297, NONCLAY REFRACTORIES														
United States	E1	135	79	7.7	201.6	5.6	11.2	130.3	510.9	443.5	954.5	16.3	6.8	333.1
California	-	6	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Georgia	E4	4	2	.2	4.6	.2	.4	3.1	5.0	10.5	15.9	(D)	(NA)	(NA)
Illinois	E2	7	5	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.2	12.7
Indiana	E1	7	3	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
Kentucky	-	6	2	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
Michigan	-	7	5	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
Missouri	-	3	3	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
New Jersey	-	3	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
New York	-	7	4	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
North Carolina	-	2	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Ohio	E2	24	14	1.6	42.2	1.1	2.4	26.6	117.0	105.1	219.1	(D)	1.8	82.2
Pennsylvania	E1	22	15	1.5	40.3	1.1	2.2	26.5	106.3	94.0	203.7	5.1	1.4	64.4
West Virginia	E1	3	3	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
INDUSTRY 3299, NONMETALLIC MINERAL PRODUCTS, N.E.C.														
United States	E2	543	89	7.6	134.6	5.7	10.8	84.9	351.8	248.4	597.1	13.0	6.5	240.3
California	E4	89	15	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Colorado	E5	11	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.3	8.8
Florida	E5	55	6	.5	7.5	.3	.6	4.4	20.6	12.5	33.1	(D)	.3	12.2
Georgia	E3	14	3	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Illinois	-	19	4	.5	8.4	.4	.7	4.4	20.8	9.2	29.9	(D)	BB	(D)
Massachusetts	E1	14	4	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Michigan	E2	15	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Missouri	E1	17	2	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.2	6.6
New Jersey	E1	20	6	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
New York	E4	35	5	.5	9.0	.4	.8	6.0	23.0	9.9	33.1	.7	1.0	55.7
Ohio	E2	29	7	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.4	14.3
Oklahoma	E3	11	3	.2	2.6	.1	.2	1.3	9.6	5.7	15.3	(D)	(NA)	(NA)
Pennsylvania	E2	27	2	.2	4.2	.2	.3	2.5	8.8	8.7	17.9	.8	.4	20.7
Texas	E1	38	4	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
Virginia	-	4	3	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)

Note: For qualifications of data, see footnotes on table 1a.

¹Payroll and sales data for some small single-unit companies with up to 20 employees (cutoff varied by industry) were obtained from administrative records of other Government agencies rather than from census report forms. These data were then used in conjunction with industry averages to estimate the items shown for these small establishments. This technique was also used for a small number of other establishments whose reports were not received at the time data were tabulated. The following symbols are shown for those States where estimated value of shipments data based on administrative-record data account for 10 percent or more of figure shown: E1—10 to 19 percent; E2—20 to 29 percent; E3—30 to 39 percent; E4—40 to 49 percent; E5—50 to 59 percent; E6—60 to 69 percent; E7—70 to 79 percent; E8—80 to 89 percent; E9—90 percent or more.

²Statistics for some producing States have been withheld to avoid disclosing data for individual companies. However, for States with 150 employees or more, number of establishments is shown and employment-size range is indicated by one of the following symbols: AA—150 to 249 employees; BB—250 to 499 employees; CC—500 to 999 employees; EE—1,000 to 2,499 employees; FF—2,500 employees or more.

Table 3a. Summary Statistics for the Industry: 1987

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Item	Abrasive products (SIC 3291)	Asbestos products (SIC 3292)	Minerals, ground or treated (SIC 3295)	Mineral wool (SIC 3296)	Nonclay refractories (SIC 3297)	Nonmetallic mineral products, n.e.c. (SIC 3299)
Companies	360	50	245	173	99	534
All establishments	405	54	381	231	135	543
With 1 to 19 employees	227	32	273	122	56	454
With 20 to 99 employees	139	14	94	59	53	76
With 100 employees or more	39	8	14	50	26	13
Employment and labor costs:						
Employees	23.4	4.0	8.8	21.5	7.7	7.6
Compensation, total	789.3	124.2	277.3	764.7	258.5	167.8
Annual payroll	624.2	98.7	218.4	619.4	201.6	134.6
Fringe benefits	165.0	25.5	58.9	145.3	56.9	33.2
Social Security and other legally required payments	60.8	12.3	23.7	63.8	24.6	13.8
Employer payments and other programs	104.3	13.1	35.2	81.6	32.4	19.4

See footnotes at end of table.

Table 3a. **Summary Statistics for the Industry: 1987—Con.**

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Item	Abrasive products (SIC 3291)	Asbestos products (SIC 3292)	Minerals, ground or treated (SIC 3295)	Mineral wool (SIC 3296)	Nonclay refractories (SIC 3297)	Nonmetallic mineral products, n.e.c. (SIC 3299)
Production workers:						
Average for year1,000--	15.5	3.1	6.3	17.4	5.6	5.7
March.....do--	15.4	3.0	6.2	17.0	5.6	5.5
May.....do--	15.3	3.0	6.3	17.4	5.3	5.6
August.....do--	15.5	3.1	6.4	17.5	5.6	5.7
November.....do--	15.5	3.2	6.4	17.5	5.6	5.8
Hours.....millions--	31.2	6.3	12.9	36.6	11.2	10.8
January to March.....do--	7.6	1.4	3.1	8.9	2.8	2.6
April to June.....do--	7.8	1.5	3.2	9.1	2.8	2.7
July to September.....do--	7.7	1.6	3.3	9.1	2.7	2.7
October to December.....do--	8.0	1.7	3.3	9.5	2.9	2.8
Wages.....mil dol--	349.9	70.3	149.8	483.6	130.3	84.9
Value added by manufacture.....do--	2 001.2	202.6	834.4	1 985.6	510.9	351.8
Cost of materials ¹do--	1 656.3	185.2	563.9	1 268.8	443.5	248.4
Materials, parts, containers, etc., consumed ²do--	1 384.1	157.4	434.9	951.1	367.5	201.7
Resales.....do--	187.0	(D)	11.9	47.0	29.6	12.8
Fuels.....do--	19.7	4.7	53.5	114.7	18.7	18.4
Purchased electricity.....do--	38.3	7.8	47.3	140.6	20.3	13.1
Contract work.....do--	27.2	(D)	16.3	15.4	7.4	2.4
Quantity of electric energy used for heat and power:						
Purchased.....mil kWh--	783.1	138.8	961.4	3 250.2	395.8	248.7
Generated less sold.....do--	(D)	-	(D)	-	-	-
Total value of shipments.....mil dol--	3 621.4	386.5	1 406.2	3 260.3	954.5	597.1
Primary products.....do--	2 691.4	346.9	1 283.8	3 070.9	829.5	520.1
Secondary products.....do--	582.3	21.1	60.0	126.1	87.7	56.2
Miscellaneous receipts, total.....do--	347.7	18.5	62.4	63.3	37.3	20.8
Value of resales.....do--	337.5	(D)	16.7	57.2	34.3	16.5
Contract receipts.....do--	8.8	-	22.7	(D)	(D)	(D)
Other miscellaneous receipts.....do--	1.4	(D)	23.0	(D)	(D)	(D)
Inventories by stage of fabrication:						
Beginning of 1987.....mil dol--	558.4	47.2	205.8	249.7	187.9	82.1
Finished goods.....do--	264.3	24.0	73.6	149.5	87.3	42.6
Work in process.....do--	155.1	13.4	46.9	12.4	24.9	11.5
Materials and supplies.....do--	139.0	9.8	85.3	87.8	75.7	28.0
End of 1987.....do--	596.7	49.6	190.7	242.5	189.8	86.4
Finished goods.....do--	253.0	23.7	73.1	143.7	84.0	44.5
Work in process.....do--	202.5	15.1	39.4	12.2	28.1	12.7
Materials and supplies.....do--	141.2	10.8	78.1	86.6	77.6	29.2
Primary product specialization ratio.....percent--	82	94	96	96	90	90
Coverage ratio.....do--	94	89	95	98	85	87

Note: For qualifications of data, see footnotes on table 1a.

¹Data on purchased services for the repair of buildings and machinery and for communication services are not included in cost of materials, etc., but are shown in table 3c.²Data on materials consumed by type are shown in table 7. Data on amount purchased or transferred from foreign sources are shown in table 3c.Table 3b. **Gross Book Value of Depreciable Assets, Capital Expenditures, Retirements, Depreciation, and Rental Payments: 1987**

[Million dollars. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Item	Abrasive products (SIC 3291)	Asbestos products (SIC 3292)	Minerals, ground or treated (SIC 3295)	Mineral wool (SIC 3296)	Nonclay refractories (SIC 3297)	Nonmetallic mineral products, n.e.c. (SIC 3299)
Gross book value of depreciable assets:						
Total:						
Beginning of year.....	1 270.7	149.5	957.8	1 790.7	366.2	314.2
New capital expenditures ¹	113.5	14.9	53.2	177.6	16.3	13.0
Used capital expenditures.....	9.5	.4	7.1	7.1	1.3	1.5
Retirements.....	59.3	6.9	19.1	95.0	12.2	3.4
End of year.....	1 334.4	157.9	999.0	1 880.4	371.6	325.3
Buildings and other structures:						
Beginning of year.....	327.0	29.7	134.1	350.9	96.7	74.0
New capital expenditures.....	11.7	.9	5.3	18.7	2.4	2.3
Used capital expenditures.....	1.2	.1	1.1	2.3	.3	.1
Retirements.....	4.4	1.2	2.2	6.3	2.6	1.1
End of year.....	335.4	29.4	138.3	365.7	96.8	75.4
Machinery and equipment:						
Beginning of year.....	943.7	119.8	823.7	1 439.8	269.5	240.1
New capital expenditures ¹	101.9	13.9	47.8	158.8	13.9	10.7
Used capital expenditures.....	8.3	.4	5.9	4.8	1.0	1.3
Retirements.....	54.8	5.7	16.8	88.8	9.7	2.3
End of year.....	999.0	128.4	860.6	1 514.6	274.8	249.9
Depreciation charges during 1987:						
Total.....	99.5	8.9	67.4	138.2	23.2	20.0
Buildings and other structures.....	15.6	1.2	6.0	16.4	3.9	3.3
Machinery and equipment.....	83.9	7.7	61.4	121.7	19.2	16.8
Rental payments:						
Total.....	27.5	2.9	8.2	15.6	3.8	6.7
Buildings and other structures.....	8.9	1.1	3.4	4.7	1.8	3.5
Machinery and equipment.....	18.6	1.8	4.8	10.9	2.0	3.2

Note: Retirements and depreciation data for establishments not included in the ASM sample were extrapolated from the historical ratio of retirements or depreciation to assets. These ratios were developed at the industry level.

¹Data on new machinery and equipment expenditures by type are provided in table 3c.

Table 3c. Supplemental Industry Statistics Based on Sample Estimates: 1987

(For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes)

Item	Abrasive products (SIC 3291)		Asbestos products (SIC 3292)		Minerals, ground or treated (SIC 3295)	
	Amount (million dollars)	Relative standard error of estimate ¹ (percent)	Amount (million dollars)	Relative standard error of estimate ¹ (percent)	Amount (million dollars)	Relative standard error of estimate ¹ (percent)
Purchased services:						
Cost of purchased services for the repair of-						
Buildings and other structures	5.2	(X)	.4	(X)	(S)	(X)
Response coverage ratio (percent) ²	69.1	(X)	64.2	(X)	(S)	(X)
Machinery	20.9	(X)	4.1	(X)	(S)	(X)
Response coverage ratio (percent) ²	80.9	(X)	64.2	(X)	(S)	(X)
Cost of purchased communication services	6.9	(X)	.7	(X)	(S)	(X)
Response coverage ratio (percent) ²	72.6	(X)	64.2	(X)	(S)	(X)
New machinery and equipment expenditures	101.9	(X)	13.9	(X)	47.8	(X)
Automobiles, trucks, etc., for highway use	2.3	21	.1	4	.8	13
Computers and peripheral data processing equipment	3.7	18	2.2	2	.2	41
All other	95.9	1	11.6	1	46.8	1
Adjustment ratio ³	1.1	(X)	1.3	(X)	1.4	(X)
Cost of materials, components, parts, etc., used	1 384.1	(X)	157.4	(X)	434.9	(X)
Materials purchased or transferred from foreign sources ⁴	(S)	25	8.7	5	(S)	15
Materials purchased or transferred from domestic sources	(S)	6	148.8	1	(S)	3
Adjustment ratio ³	(S)	(X)	1.4	(X)	(S)	(X)
Item	Mineral wool (SIC 3296)		Nonclay refractories (SIC 3297)		Nonmetallic mineral products, n.e.c. (SIC 3299)	
	Amount (million dollars)	Relative standard error of estimate ¹ (percent)	Amount (million dollars)	Relative standard error of estimate ¹ (percent)	Amount (million dollars)	Relative standard error of estimate ¹ (percent)
Purchased services:						
Cost of purchased services for the repair of-						
Buildings and other structures	9.2	(X)	1.3	(X)	(S)	(X)
Response coverage ratio (percent) ²	83.7	(X)	57.7	(X)	(S)	(X)
Machinery	56.6	(X)	6.8	(X)	(S)	(X)
Response coverage ratio (percent) ²	86.2	(X)	61.4	(X)	(S)	(X)
Cost of purchased communication services	4.3	(X)	1.3	(X)	.6	(X)
Response coverage ratio (percent) ²	85.0	(X)	68.7	(X)	53.2	(X)
New machinery and equipment expenditures	158.8	(X)	13.9	(X)	10.7	(X)
Automobiles, trucks, etc., for highway use	.8	9	(Z)	14	.3	17
Computers and peripheral data processing equipment	3.1	5	.3	13	.7	19
All other	155.0	1	13.5	1	9.7	2
Adjustment ratio ³	2.0	(X)	1.6	(X)	1.9	(X)
Cost of materials, components, parts, etc., used	951.1	(X)	367.5	(X)	201.7	(X)
Materials purchased or transferred from foreign sources ⁴	16.8	14	74.0	9	82.5	20
Materials purchased or transferred from domestic sources	934.3	1	293.4	3	119.2	14
Adjustment ratio ³	1.1	(X)	1.6	(X)	1.9	(X)

¹For description of relative standard error of estimate, see Qualifications of the Data in appendixes.²Measure of extent to which respondents reported each item. Derived for each item by calculating the ratio of weighted employment for those sample establishments that reported the specific inquiry to total employment for all establishments classified in industry. (See appendixes for explanation of sample weight.)³Detail has been adjusted upwards to account for nonresponse. Inverse of the ratio shown represents a measure of the response to the inquiry. (See appendixes for further explanation.)⁴Data may understate the true cost of imported parts, components, and supplies since some respondents do not know the origin of these materials. Includes cases where materials were purchased from secondary suppliers or where they were transferred from company-operated warehouses or other distribution points. Direct purchases from foreign suppliers and importers by domestic manufacturing establishments are believed to be reported accurately.

Table 4. Industry Statistics by Employment Size of Establishment: 1987

(For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes)

Industry and employment size class	E ¹	All estab- lish- ments (no.)	All employees		Production workers			Value added by manufac- ture (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expend- itures (million dollars)	End-of- year inven- tories (million dollars)
			Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)					
INDUSTRY 3291, ABRASIVE PRODUCTS												
Total -----	-	405	23.4	624.2	15.5	31.2	349.9	2 001.2	1 656.3	3 621.4	113.5	596.7
Establishments with an average of—												
1 to 4 employees -----	E9	83	.2	3.0	.1	.2	1.7	10.8	8.8	19.3	.3	3.2
5 to 9 employees -----	E8	56	.4	7.2	.3	.5	4.3	25.5	21.2	46.7	.6	6.2
10 to 19 employees -----	E7	88	1.3	28.7	.8	1.7	15.6	90.6	86.4	177.1	2.6	26.0
20 to 49 employees -----	E3	95	3.1	66.6	2.1	4.2	37.1	167.8	132.8	299.7	4.1	50.2
50 to 99 employees -----	-	44	3.1	69.1	2.2	4.6	41.3	177.5	155.2	330.7	7.7	55.3
100 to 249 employees -----	-	21	3.1	72.9	2.2	4.4	42.0	207.2	201.8	404.3	6.7	91.0
250 to 499 employees -----	-	10	3.2	77.7	2.4	4.8	49.7	330.3	386.7	704.8	16.7	96.8
500 to 999 employees -----	-	6	9.2	299.1	5.3	10.8	158.3	991.6	663.6	1 638.7	74.8	268.1
1,000 to 2,499 employees -----	-	1	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
2,500 employees or more -----	-	1	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Covered by administrative records ² -----	E9	197	1.8	33.0	1.2	2.4	18.4	121.2	105.3	226.5	3.2	32.6

See footnotes at end of table.

Table 4. Industry Statistics by Employment Size of Establishment: 1987—Con.

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry end employment size class	E ¹	All estab- lish- ments (no.)	All employees		Production workers			Value added by manufac- ture (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expend- itures (million dollars)	End-of- year invent- ories (million dollars)
			Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Weges (million dollars)					
INDUSTRY 3292, ASBESTOS PRODUCTS												
Total	-	54	4.0	98.7	3.1	8.3	70.3	202.8	185.2	388.5	14.9	49.6
Establishments with an average of—												
1 to 4 employees	E6	7	(Z)	.2	(Z)	(Z)	.2	.5	.7	1.3	(Z)	.3
5 to 9 employees	E7	12	.1	1.7	.1	.1	1.3	4.3	4.2	8.5	.3	1.4
10 to 19 employees	E8	13	.2	3.9	.1	.3	2.9	9.6	7.2	16.8	.7	3.4
20 to 49 employees	E5	9	.3	6.3	.2	.3	4.5	13.2	10.4	25.3	.6	4.0
50 to 99 employees	-	5	.3	6.4	.3	.5	4.6	18.4	13.9	32.3	.9	5.9
100 to 249 employees	-	4	.6	11.7	.5	.9	9.7	42.1	32.0	75.0	1.3	9.5
500 to 999 employees	-	4	2.5	68.4	1.9	4.1	47.1	114.6	116.8	227.3	11.0	25.1
Covered by administrative records ²	E9	29	.3	6.4	.2	.4	4.7	15.1	11.4	26.5	1.1	5.4
INDUSTRY 3295, MINERALS, GROUND OR TREATED												
Total	-	381	8.8	218.4	6.4	12.9	149.8	834.4	563.9	1 406.2	53.2	190.7
Establishments with an average of—												
1 to 4 employees	E6	70	.2	3.2	.1	.2	2.1	14.0	9.4	22.5	.6	5.0
5 to 9 employees	E3	94	.7	14.0	.5	.9	9.7	50.6	43.3	95.3	2.5	12.2
10 to 19 employees	E1	109	1.5	34.9	1.1	2.2	23.7	129.9	124.1	253.7	4.7	38.6
20 to 49 employees	E1	69	2.0	48.7	1.5	2.9	32.6	180.8	137.9	320.1	10.9	40.3
50 to 99 employees	-	25	1.7	44.0	1.3	2.7	29.6	164.9	103.1	264.7	10.2	40.8
100 to 249 employees	-	12	2.7	73.6	1.8	3.9	52.0	294.2	146.0	449.9	24.3	53.6
250 to 499 employees	-	1	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
500 to 999 employees	-	1	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Covered by administrative records ²	E9	53	.2	2.4	.1	.2	1.6	10.2	7.9	18.1	.4	2.8
INDUSTRY 3296, MINERAL WOOL												
Total	-	231	21.5	619.4	17.4	36.6	483.6	1 985.6	1 268.8	3 260.3	177.6	242.5
Establishments with an average of—												
1 to 4 employees	E6	55	.1	1.7	.1	.2	1.4	5.9	4.3	10.1	.3	.8
5 to 9 employees	E7	30	.2	3.4	.2	.3	2.4	10.7	8.6	19.4	.8	1.2
10 to 19 employees	E4	37	.5	10.2	.4	.7	6.4	34.2	33.6	68.7	2.0	5.4
20 to 49 employees	E3	40	1.3	25.6	1.0	2.0	18.1	73.9	76.3	150.2	3.9	13.4
50 to 99 employees	E1	19	1.4	31.3	1.1	2.2	20.5	71.6	79.3	149.4	4.3	11.8
100 to 249 employees	-	19	2.9	72.0	2.3	5.0	54.4	197.6	180.0	377.3	9.9	35.5
250 to 499 employees	-	21	7.8	233.5	6.2	13.1	181.7	818.9	465.8	1 288.3	45.1	86.5
500 to 999 employees	-	9	7.3	241.7	6.2	13.1	198.7	772.8	421.0	1 196.9	111.2	88.0
1,000 to 2,499 employees	-	1	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Covered by administrative records ²	E9	88	.5	7.3	.4	.7	5.6	23.9	14.3	38.1	1.6	2.4
INDUSTRY 3297, NONCLAY REFRACTORIES												
Total	E1	135	7.7	201.6	5.6	11.2	130.3	510.9	443.5	954.5	16.3	189.8
Establishments with an average of—												
1 to 4 employees	E5	25	.1	1.2	(Z)	.1	.8	2.8	6.3	9.0	.2	1.9
5 to 9 employees	E5	13	.1	2.2	.1	.1	1.4	5.8	6.3	12.2	.1	3.6
10 to 19 employees	E4	18	.2	4.7	.2	.4	3.3	13.7	15.4	29.1	.6	4.5
20 to 49 employees	E3	34	1.2	24.8	.8	1.7	15.9	59.3	56.7	114.4	2.4	19.9
50 to 99 employees	-	19	1.3	30.1	1.0	2.0	21.2	89.4	92.8	184.1	2.6	39.3
100 to 249 employees	-	23	3.8	107.0	2.6	5.4	64.2	271.1	216.1	488.8	9.4	88.6
250 to 499 employees	-	3	1.1	31.6	.9	1.5	23.5	68.8	50.0	116.9	1.0	32.1
Covered by administrative records ²	E9	47	.4	7.5	.3	.6	5.0	18.2	17.2	35.4	.6	6.8
INDUSTRY 3299, NONMETALLIC MINERAL PRODUCTS, N.E.C.												
Total	E2	543	7.6	134.6	5.7	10.8	84.9	351.8	248.4	597.1	13.0	86.4
Establishments with an average of—												
1 to 4 employees	E8	246	.5	7.2	.3	.6	4.4	20.5	9.2	29.7	.7	4.6
5 to 9 employees	E7	112	.8	11.4	.6	1.1	7.4	31.9	16.4	48.4	1.1	7.0
10 to 19 employees	E5	96	1.3	20.0	.9	1.8	12.9	54.3	30.9	85.2	1.8	12.1
20 to 49 employees	E2	55	1.6	30.9	1.1	2.1	17.1	78.4	66.7	144.9	3.7	19.3
50 to 99 employees	E1	21	1.3	24.5	1.0	2.0	15.4	64.0	42.0	104.7	2.1	14.8
100 to 249 employees	-	12	2.1	40.7	1.7	3.1	27.8	102.6	83.1	184.2	3.7	28.5
250 to 499 employees	-	1	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Covered by administrative records ²	E9	348	1.7	20.4	1.2	2.3	13.2	59.5	27.7	87.2	1.7	13.4

Note: For qualifications of data, see footnotes on table 1a. Data shown as a (D) are included in underscored figures above.

¹Payroll and sales data for some small single unit companies with up to 20 employees (cutoff varied by industry) were obtained from administrative records of other Government agencies rather than from census report forms. These data were then used in conjunction with industry averages to estimate the items shown for these small establishments. This technique was also used for a small number of other establishments whose reports were not received at the time data were tabulated. The following symbols are shown for those employment-size classes where estimated data based on administrative-record data account for 10 percent or more of figures shown: E1—10 to 19 percent; E2—20 to 29 percent; E3—30 to 39 percent; E4—40 to 49 percent; E5—50 to 59 percent; E6—60 to 69 percent; E7—70 to 79 percent; E8—80 to 89 percent; E9—90 percent or more.

²Report forms were not mailed to small single unit companies with up to 20 employees (cutoff varied by industry). Payroll and sales data for 1987 were obtained from administrative records supplied by other agencies of the Federal Government. Those data were then used in conjunction with industry averages to estimate the items shown. Data are also included in respective employment-size classes shown.

Table 5a. Industry Statistics by Industry and Primary Product Class Specialization: 1987

[Table presents selected statistics for establishments according to their degree of specialization in products primary to their industry. Measures of plant specialization shown are (1) industry specialization: ratio of primary product shipments to total product shipments (primary plus secondary, excluding miscellaneous receipts) for the establishment; and (2) product class specialization: ratio of largest primary product class shipments to total product shipments (primary plus secondary, excluding miscellaneous receipts) for the establishment. See appendix for method of computing ratios. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry or product class code	Industry or primary product class	All establishments (number)	All employees		Production workers			Value added by manufacture (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)
			Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)				
3291	Abrasive products: All establishments in industry -----	405	23.4	624.2	15.5	31.2	349.9	2 001.2	1 656.3	3 621.4	113.5
	Establishments with this product class primary:										
32915	Nonmetallic sized grains, powders, and flour abrasives -----	24	2.4	78.6	1.5	3.2	41.6	179.6	203.1	372.8	10.1
32916	Nonmetallic abrasive products -----	85	8.9	242.1	5.6	11.1	124.4	530.5	264.2	794.6	42.7
32917	Nonmetallic coated abrasive products and buffing wheels, polishing wheels, and laps -----	43	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
32918	Metal abrasives (including scouring pads) -----	18	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
3292	Asbestos products: All establishments in industry -----	54	4.0	98.7	3.1	6.3	70.3	202.6	185.2	386.5	14.9
	Establishments with this product class primary:										
32922	Asbestos friction materials -----	9	3.1	78.8	2.4	5.0	55.7	148.3	144.5	289.2	11.9
32927	Other asbestos products -----	8	.4	9.7	.3	.6	7.1	30.6	24.1	57.1	1.4
3295	Minerals, ground or treated: All establishments in industry -----	381	8.8	218.4	6.4	12.9	149.8	834.4	563.9	1 406.2	53.2
3296	Mineral wool: All establishments in industry -----	231	21.5	619.4	17.4	36.6	483.6	1 985.6	1 268.8	3 260.3	177.6
	Establishments with this product class primary:										
32961	Mineral wool for thermal and acoustical envelope insulation -----	67	14.9	458.7	12.2	25.9	361.4	1 584.0	957.7	2 549.7	150.2
32962	Mineral wool for industrial, equipment, and appliance insulation -----	36	4.8	125.9	3.9	8.1	99.0	294.1	245.0	537.1	20.5
3297	Nonclay refractories: All establishments in industry -----	135	7.7	201.6	5.6	11.2	130.3	510.9	443.5	954.5	16.3
3299	Nonmetallic mineral products, n.e.c.: All establishments in industry -----	543	7.6	134.6	5.7	10.8	84.9	351.8	248.4	597.1	13.0

Note: For qualifications of data, see footnotes on table 1a.

Table 5b. Industry-Product Analysis—Value of Shipments and Primary Product Shipments and Specialization and Coverage Ratios for the Industry: 1987 and Earlier Census Years

[An establishment is assigned to an industry based on shipment values of products representing largest amount considered primary to an industry. Frequently, establishment shipments comprise mixtures of products assigned to an industry (primary), those considered primary to other industries (secondary), and receipts for activities such as merchandising or contract work. Columns A-D show this product pattern for an industry, and column E shows primary product specialization ratio. The extent to which an industry's primary products are shipped by establishments classified in and out of an industry is shown in columns F-H and coverage ratio is shown in column I. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry and product group code	Industry and census year	Value of shipments					Value of primary product shipments			
		Total (million dollars)	Primary products (million dollars)	Secondary products (million dollars)	Miscellaneous receipts (million dollars)	Primary product specialization ratio col. B ÷ col. E (percent)	Total made in all industries (million dollars)	Made in this industry (million dollars)	Made in other industries (million dollars)	Coverage ratio col. B ÷ col. F (percent)
		A	B	C	D	E	F	G	H	I
3291	Abrasive products -----									
	1987..	3 621.4	2 691.4	582.3	347.7	82	2 871.6	2 691.4	180.2	94
	1982..	2 750.7	2 034.9	420.4	295.4	83	2 135.7	2 034.9	100.9	95
	1977..	1 955.8	1 667.9	187.4	100.5	90	1 721.8	1 667.9	53.9	97
3292	Asbestos products -----									
	1987..	386.5	346.9	21.1	18.5	94	389.7	346.9	42.8	89
	1982..	842.8	762.0	65.2	15.6	92	841.0	762.0	79.0	91
	1977..	882.1	781.4	66.7	34.0	92	960.1	781.4	178.7	81
3295	Minerals, ground or treated -----									
	1987..	1 406.2	1 283.8	60.0	62.4	96	1 344.8	1 283.8	61.0	95
	1982..	1 256.5	1 166.1	25.4	65.1	98	1 252.9	1 166.1	86.8	93
	1977..	957.3	818.6	33.1	105.5	96	911.0	818.6	92.4	90
3296	Mineral wool -----									
	1987..	3 260.3	3 070.9	126.1	63.3	96	3 145.9	3 070.9	74.9	98
	1982..	2 281.1	2 144.2	67.9	69.0	97	2 215.2	2 144.2	71.0	97
	1977..	1 790.5	1 608.1	128.2	54.3	93	1 684.0	1 608.1	75.9	96
3297	Nonclay refractories -----									
	1987..	954.5	829.5	87.7	37.3	90	972.4	829.5	142.9	85
	1982..	691.0	588.7	94.9	7.4	86	715.8	588.7	127.1	82
	1977..	680.2	607.1	52.5	20.6	92	734.0	607.1	126.9	83
3299	Nonmetallic mineral products, n.e.c. -----									
	1987..	597.1	520.1	56.2	20.8	90	597.6	520.1	77.5	87
	1982..	422.3	393.6	20.8	7.9	95	453.8	393.6	60.2	87
	1977..	387.3	347.1	27.2	13.0	93	391.1	347.1	44.0	89

Table 6a-1. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1987 and 1982

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendixes. For comparability of product classes and product codes between 1982 and 1987, see appendixes. For meaning of abbreviations and symbols, see introductory text]

1987 product code	Product	1987			1982		
		Number of companies with shipments of \$100,000 or more	Product shipments ¹		Number of companies with shipments of \$100,000 or more	Product shipments ¹	
			Quantity ²	Value (million dollars)		Quantity ²	Value (million dollars)
3291- —	ABRASIVE PRODUCTS						
	Total	(NA)	(X)	2 871.6	(NA)	(X)	2 135.7
32915 —	Nonmetallic sized grains, powders, and flour abrasives (including graded products only)	(NA)	(X)	413.2	(NA)	(X)	409.7
32915 17	Artificial (synthetic): Silicon carbide	7	(S)	65.2	13	**103.6	85.6
32915 19	Aluminum oxide	8	(S)	120.2	15	*166.9	104.0
32915 29	Other artificial sized grains, powders, and flour (including combinations of silicon carbide and aluminum oxide, boron carbide, tungsten carbide, synthetic diamond, etc.)	12	(X)	187.7	22	(X)	208.9
32915 48	Natural sized grains, powders, and flour	13	(X)	50.1	6	(X)	11.1
32915 00	Nonmetallic sized grains, powders, and flour abrasives, n.s.k.	(NA)	(X)	9.9	(NA)	(X)	—
32916 —	Nonmetallic abrasive products (including diamond abrasives) Artificial and natural bonded abrasives (including grinding wheels, sticks, stones, hones, balls, and bricks; excluding refractory bricks, floor and stair brick, and similar byproducts):	(NA)	(X)	657.2	(NA)	(X)	610.8
32916 31	Vitrified bond	21	(X)	182.8	28	(X)	181.3
32916 37	Resinoid and shellac bond-reinforced	24	(X)	115.7	36	(X)	95.4
32916 42	Resinoid and shellac bond-nonreinforced	24	(X)	106.6	31	(X)	130.1
32916 44	Rubber bond	8	(X)	16.6	11	(X)	19.5
32916 65	Other bonded abrasives	7	(X)	10.6	8	(X)	5.0
32916 72	Diamond wheels: Metal bond	30	(S)	79.9	25	(S)	57.8
32916 74	Other bond	25	(S)	43.0	31	(S)	54.6
32916 76	Cubic boron nitride wheels, all bonds	11	(S)	13.5	10	*764.0	7.7
32916 98	Other artificial and natural nonmetallic abrasive products (except coated abrasives; including grinding, lapping, buffing compounds, crude lump forms, etc.)	7	(X)	23.9	25	(X)	59.1
32916 00	Nonmetallic abrasive products, n.s.k.	(NA)	(X)	64.6	(NA)	(X)	.3
32917 —	Nonmetallic coated abrasive products and buffing wheels, polishing wheels, and laps	(NA)	(X)	1 286.2	(NA)	(X)	843.1
	Coated or impregnated with any natural or artificial abrasive material:						
32917 12	Cloth-glue bond: Belts	5	(S)	9.1	7	(S)	16.5
32917 14	Other shapes	9	(S)	74.5	13	(S)	62.9
32917 16	Cloth-resin and waterproof bond: Belts	13	(S)	236.2	11	(S)	182.2
32917 18	Other shapes	10	(D)	(D)	15	(S)	81.9
32917 23	Paper-glue bond	14	(D)	(D)	(NA)	(S)	184.5
32917 40	Other (including paper-cloth combination, vulcanized fiber-cloth combination, vulcanized fibers, paper-resin, and waterproof bond, etc.)	13	(S)	255.1	(NA)	(D)	271.0
32917 71	Buffing and polishing wheels and laps made of cloth, leather, felt, and other materials (containing no abrasive grains, powders, or flour)	11	(X)	45.1	15	(X)	43.0
32917 00	Nonmetallic coated abrasive products and buffing wheels, polishing wheels, and laps, n.s.k.	(NA)	(X)	30.7	(NA)	(X)	1.2
32918 —	Metal abrasives (including scouring pads)	(NA)	(X)	204.2	(NA)	(X)	173.9
32918 11	Steel and iron grit, shot, and sand	9	*237.7	80.4	8	*138.3	55.2
32918 31	Steel wool	3	16.9	30.3	3	(S)	17.6
32918 90	Other metal abrasives and scouring pads (including metal pads with soaps)	9	(X)	93.4	14	(X)	100.5
32918 00	Metal abrasives, n.s.k.	(NA)	(X)	—	(NA)	(X)	.5
32910 —	Abrasive products, n.s.k.	(NA)	(X)	310.8	(NA)	(X)	98.3
32910 00	Abrasive products, n.s.k., typically for establishments with 20 employees or more (see note)	(NA)	(X)	103.8	(NA)	(X)	25.2
32910 02	Abrasive products, n.s.k., typically for establishments with less than 20 employees (see note)	(NA)	(X)	207.1	(NA)	(X)	73.1
3292- —	ASBESTOS PRODUCTS						
	Total	(NA)	(X)	389.7	(NA)	(X)	841.0
32922 —	Asbestos friction materials	(NA)	(X)	275.0	(NA)	(X)	276.5
	Brake linings:						
32922 11	Woven, containing asbestos yarn, tape, or cloth	4	(D)	(D)	7	*23 728.4	53.2
32922 15	Molded (including all nonwoven types)	7	(S)	80.1	14	(S)	88.7
32922 21	Disc brake pads	6	(S)	87.7	9	(S)	61.4
	Clutch facing:						
32922 51	Woven, containing asbestos yarn, tape, or cloth	2	(D)	(D)	3	(?)	(?)
32922 55	Molded (including all nonwoven types)	2	(D)	(D)	4	*23.3	*72.6
32922 00	Asbestos friction materials, n.s.k.	(NA)	(X)	6.4	(NA)	(X)	.5

See footnotes at end of table.

Table 6a-1. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1987 and 1982—Con.

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendixes. For comparability of product classes and product codes between 1982 and 1987, see appendixes. For meaning of abbreviations and symbols, see introductory text.]

1987 product code	Product	1987			1982		
		Number of companies with shipments of \$100,000 or more	Product shipments ¹		Number of companies with shipments of \$100,000 or more	Product shipments ¹	
			Quantity ²	Value (million dollars)		Quantity ²	Value (million dollars)
3292- --	ASBESTOS PRODUCTS—Con.						
32927 --	Other asbestos products.....	(NA)	(X)	74.2	(NA)	(X)	544.2
32927 14	Vinyl asbestos floor tile..... mil sq yd..	-	-	-	(NA)	(D)	(D)
32927 15	Asbestos textiles:						
32927 31	Yarn, cord, thread, and cloth..... mil lb..	4	(S)	4.7	(NA)	(S)	22.5
	Other asbestos textiles (including roving, lap, wick, rope, tape, carded fibers, etc.)..... do..	-	(D)	(D)	6	(S)	16.6
32927 33	Asbestos felts:						
	Roofing, asphalt or tar saturated 1,000 s tons..	2	(D)	(D)	5	*34.5	23.1
32927 34	Other do..	1	(D)	(D)	5	**13.9	10.5
32927 36	Insulation materials containing asbestos (including pipe and block insulation) do..	1	(X)	(D)	5	(X)	4.1
32927 41	Asbestos-cement products:						
	Flat sheets and wallboard, all thicknesses converted to 1/4 in. basis 1,000 sq ft..	-	-	-	5	*247.9	22.6
32927 77	Shingles and clapboard (including accessories) mil squares..	1	(D)	(D)	3	(S)	22.0
32927 78	Other, including corrugated sheets, pipe, conduits, ducts, etc.	3	(X)	38.3	(NA)	(NA)	117.6
32927 98	Other asbestos products (including asphalt floor tile, millboard, prefabricated housing components, etc.)	-	(X)	(D)	(NA)	(D)	(D)
32927 00	Other asbestos products, n.s.k.	(NA)	(X)	.1	(NA)	(X)	-
32920 --	Asbestos products, n.s.k.	(NA)	(X)	40.5	(NA)	(X)	20.3
32920 00	Asbestos products, n.s.k., typically for establishments with 20 employees or more (see note)	(NA)	(X)	14.2	(NA)	(X)	7.1
32920 02	Asbestos products, n.s.k., typically for establishments with less than 20 employees (see note)	(NA)	(X)	26.3	(NA)	(X)	13.2
3295- --	MINERALS AND EARTHS, GROUND OR OTHERWISE TREATED						
	Total	(NA)	(X)	1 344.8	(NA)	(X)	1 252.9
32950 --	Minerals and earths, ground or otherwise treated:						
32950 11	Lightweight aggregate (such as diatomaceous earth, expanded clay, expanded slag, cinders, perlite, haydite, pumice, but excluding vermiculite) 1,000 s tons..	51	(S)	121.0	59	**2 397.9	198.5
32950 13	Exfoliated vermiculite:						
32950 15	Aggregate mil cu ft..	13	(D)	(D)	15	*62.0	78.6
32950 20	Other (such as loose fill insulation, acoustical, etc.)	5	**22.2	20.0	6	*18.2	16.8
32950 31	Refractory magnesia, including dead-burned magnesia or magnesite (for additional detail, see Current Industrial Report MQ-32C, Refractories)	9	(X)	98.6	10	(X)	129.5
32950 61	Crushed slag 1,000 s tons..	20	(S)	106.0	21	**16 142.0	64.6
32950 81	Crushed and ground uncalcined gypsum, including gypsite and anhydrite..... do..	7	296.5	7.4	12	*1 181.4	20.0
32950 84	Natural graphite, ground, refined, or blended..... do..	4	(S)	35.3	8	230.8	128.9
32950 85	Ground crude fire clay, high alumina clay, and silica fire clay do..	12	(S)	39.0	14	(S)	28.1
32950 86	Clays artificially activated with acid or other materials..... do..	10	*646.4	136.5	9	(S)	36.5
42950 93	Mica, ground or treated..... do..	7	(S)	5.6	6	**38.5	8.0
32950 98	Talc, steatite, soapstone, and pyrophyllite, ground or otherwise treated do..	3	(D)	(D)	4	(S)	26.6
32950 00	Other minerals and earths, ground or otherwise treated, including feldspar, roofing granules, and ground barite	62	(S)	495.6	71	(X)	453.8
32950 02	Minerals, ground or treated, n.s.k., typically for establishments with 20 employees or more (see note)	(NA)	(X)	140.3	(NA)	(X)	41.8
32950 02	Minerals, ground or treated, n.s.k., typically for establishments with less than 20 employees (see note)	(NA)	(X)	19.1	(NA)	(X)	21.2
3296- --	MINERAL WOOL						
	Total	(NA)	(X)	3 145.9	(NA)	(X)	2 215.2
32961 --	Mineral wool for thermal and acoustical envelope insulation (for insulating homes, and commercial and industrial buildings)	(NA)	(X)	2 180.0	(NA)	(X)	1 556.0
32961 11	Loose fiber (blowing and pouring) (shipped as such) and granulated fiber 1,000 s tons..	8	**235.2	95.5	(NA)	(*)	(*)
32961 31	Building batts, blankets, and rolls (in thermal resistance (R) values):						
	R-19.0 or more 1,000 s tons..	12	(S)	641.4	(NA)	588.1	432.2
32961 35	R-11.0 to R-18.9 do..	12	(S)	421.4	(NA)	468.5	360.6
32961 38	R-10.9 or less do..	7	**54.2	56.4	(NA)	(S)	51.7
32961 51	Board (such as roof insulation) do..	6	(S)	117.1	(NA)	(*)	(*)
32961 61	Acoustical, such as wall and ceiling (sold as acoustical insulation) do..	13	(S)	600.9	(NA)	(S)	331.2
32961 98	Other mineral wool for thermal insulation do..	10	(S)	133.5	(NA)	(S)	4379.2
32961 00	Mineral wool for thermal and acoustical envelope insulation (for insulating homes, and commercial and industrial buildings), n.s.k.	(NA)	(X)	114.0	(NA)	(X)	1.1

See footnotes at end of table.

Table 6a-1. **Product and Product Classes—Quantity and Value of Shipments by All Producers: 1987 and 1982—Con.**

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendixes. For comparability of product classes and product codes between 1982 and 1987, see appendixes. For meaning of abbreviations and symbols, see introductory text]

1987 product code	Product	1987			1982		
		Number of companies with shipments of \$100,000 or more	Product shipments ¹		Number of companies with shipments of \$100,000 or more	Product shipments ¹	
			Quantity ²	Value (million dollars)		Quantity ²	Value (million dollars)
3296--	MINERAL WOOL—Con.						
32962 --	Mineral wool for industrial, equipment, and appliance insulation	(NA)	(X)	786.8	(NA)	(X)	625.7
	Blankets (flexible) (including fabricated pieces, rolls, and batts):						
32962 31	Plain ----- 1,000 s						
	tons-----	12	(S)	96.0	(NA)	(S)	156.7
32962 34	Coated ----- do--	5	(S)	38.6	(NA)	(S)	67.2
32962 36	Faced and metal meshed ----- do--	7	(S)	8.2			
32962 45	Special purpose insulation pieces, such as special purpose automotive, appliance, and aerospace items and original equipment parts ----- do--	16	(S)	282.8	(NA)	(S)	46.7
32962 51	Other blocks and boards ----- do--	5	(D)	(D)	(NA)	(S)	10.8
32962 61	Pipe insulation ----- do--	7	32.3	117.4	(NA)	(S)	135.0
32962 83	Acoustical (including pads, boards, patches, etc.) ----- do--	5	(D)	(D)			
32962 98	Other mineral wool for insulation (including air duct, loose fiber) (shipped as such), granulated fiber, insulating, and finishing cements, high-temperature insulation fibers, etc. ----- do--	10	(S)	152.7	(NA)	(S)	208.8
32962 00	Mineral wool for industrial, equipment, and appliance insulation, n.s.k. -----	(NA)	(X)	40.1	(NA)	(X)	.4
32960 --	Mineral wool, n.s.k. -----	(NA)	(X)	179.0	(NA)	(X)	33.4
32960 00	Mineral wool, n.s.k., typically for establishments with 20 employees or more (see note) -----	(NA)	(X)	141.4	(NA)	(X)	11.2
32960 02	Mineral wool, n.s.k., typically for establishments with less than 20 employees (see note) -----	(NA)	(X)	37.6	(NA)	(X)	22.2
3297--	NONCLAY REFRACTORIES						
	Total -----	(NA)	(X)	972.4	(NA)	(X)	715.8
32970 --	Nonclay refractories, except dead-burned magnesia:						
32970 00	Nonclay refractories, except dead-burned magnesia (for additional detail, see Current Industrial Report MQ-32C, Refractories) -----	64	(X)	940.0	(NA)	(X)	700.5
32970 02	Nonclay refractories, n.s.k., typically for establishments with less than 20 employees (see note) -----	(NA)	(X)	32.4	(NA)	(X)	15.2
3299--	NONMETALLIC MINERAL PRODUCTS, N.E.C.						
	Total -----	(NA)	(X)	597.6	(NA)	(X)	453.8
32990 --	Other nonmetallic mineral products, n.e.c.:						
	Mica products:						
32990 53	Built-up sheet mica products -----	6	(X)	13.5	7	(X)	13.7
32990 55	Other sheet mica products -----	7	(X)	9.4	7	(X)	4.5
32990 56	Mica products, other than sheet -----	11	(X)	10.5	8	(X)	16.6
32990 81	Statuary and art goods (factory production) -----	28	(X)	76.2	52	(X)	40.6
32990 94	Other nonmetallic mineral products (including magnesite floor composition, stucco, artificial graphite, synthetic stones, sand-lime brick, block and tile, calcium silicate, and perlite pipe covering, etc.) -----	76	(X)	303.4	62	(X)	304.7
32990 00	Other nonmetallic mineral products, n.e.c., n.s.k., typically for establishments with 20 employees or more (see note) -----	(NA)	(X)	97.7	(NA)	(X)	41.8
32990 02	Other nonmetallic mineral products, n.e.c., n.s.k., typically for establishments with less than 20 employees (see note) -----	(NA)	(X)	86.9	(NA)	(X)	31.9

Note: In 1987 Census of Manufactures, data for establishments of small single unit companies with up to 20 employees were estimated from administrative-record data rather than data actually collected from respondents. Employment cutoffs used for administrative records for each industry and shipments figures are included in code ending with "002". In both 1987 and 1982 Censuses of Manufactures, products not completely identified on standard forms were coded in appropriate product class (five-digit) followed by "00" or to appropriate product group code (four-digit) followed by "000".

¹Data reported by all producers, not just those with shipments of \$100,000 or more.

²For some establishments, data have been estimated from central unit values which are based on quantity-value relationships of reported data. The following symbols are used when percentage of each quantity figure estimated in this manner equals or exceeds 10 percent of published figure: * 10 to 19 percent estimated; ** 20 to 29 percent estimated. If 30 percent or more is estimated, figure is replaced by (S).

³For 1982, data for product codes 32922 51 and 32922 55 are combined to avoid disclosing data for individual companies.

⁴For 1982, product codes 32961 11 and 32961 51 were combined with product code 32961 98 to avoid disclosing data for individual companies.

Table 6a-2. Related Products From Current Industrial Reports Series—Value of Shipments by All Producers: 1987 and 1982

[Additional detail is provided in the Current Industrial Report series. For meaning of abbreviations and symbols, see introductory text]

1987 product code	Product	1987 product shipments		1982 product shipments	
		Quantity	Value (million dollars)	Quantity	Value (million dollars)
	MQ32C, REFRACTORIES				
	Nonclay refractories:				
	Brick and shapes:				
32970 12	Silica brick and shapes..... mil brk equiv..	6.9	19.5	(D)	(D)
32970 13	Magnesite and magnesite-chrome brick and shapes, and chrome brick (excluding molten cast):				
	Magnesite-carbon brick and shapes, less than 7 percent carbon (predominantly pitch or resin bonded)..... mil brk equiv..	7.1	24.1	15.7	32.3
32970 14	Magnesite-carbon brick and shapes, 7 percent carbon or more (predominantly pitch and resin bonded)..... do..	10.8	67.1	6.8	28.1
32970 17	Carbon impregnated magnesite brick and shapes..... do..	3.8	15.4	5.3	24.4
32970 15	Magnesite brick and shapes, burned and unburned..... do..	4.5	16.3	(D)	(D)
32970 19	Magnesite-chrome brick and shapes, high-fired (3050 degrees F or above)..... do..	18.4	63.4	19.9	79.5
32970 20	Magnesite-chrome brick and shapes, except high- fired, including burned and unburned brick as well as chrome brick..... do..	4.6	21.5	8.5	28.0
32970 39	Carbon and graphite crucibles, retorts, stopper heads, brick, block, and other shaped refractories, including natural graphite refractories..... do..	1.8	38.6	(D)	(D)
32970 48	Silicon carbide kiln furniture (made predominantly of silicon carbide)..... do..	.7	12.1	.8	9.5
32970 49	Silicon carbide bricks and shapes (made predominantly of silicon carbide), except kiln furniture..... do..	1.1	33.8	2.5	31.5
32970 52	Mullite brick and shapes (made predominantly of synthetic or fused mullites)..... do..	2.9	19.5	2.2	12.4
32970 53	Extra high alumina brick and shapes and extra high alumina pouring pit refractories, including sleeves, nozzles, runners, tuyeres, and ladle gate parts (made predominantly of fused and synthetic alumina)..... do..	3.1	57.4	(D)	(D)
32970 55	Zircon and zirconia brick and shapes (made predominantly of either material)..... do..	1.8	22.8	1.9	20.8
32970 58	All other brick and shapes, including basic pouring pit refractories, molten cast shapes, dolomite, dolomite magnesite, forsterite, magnesite, pyrophyllite, pyrophyllite-zircon, and all other brick and shapes not classified elsewhere..... do..	4.3	138.6	(D)	(D)
	Unshaped nonclay refractories:				
	Mortars:				
32970 61	Basic bonding mortars (made predominantly of magnetic or chrome ore)..... 1,000 s tons..	(D)	(D)	4.3	1.9
32970 62	Extra-high alumina mortars (made predominantly of fused or synthetic alumina and mullite)..... do..	6.9	6.2	11.0	6.3
32970 63	Other nonclay mortars (forsterite, zircon, and silica)..... do..	(D)	(D)	3.1	1.1
	Plastics refractories and ramming mixes, wet and dry types, and castables of nonhydraulic setting type:				
32970 65	Basic castables, plastics and ramming mixes (wet and dry types)..... 1,000 s tons..	61.3	24.5	62.2	25.1
32970 64	Extra-high alumina plastics and ramming mixes (made predominantly of fused or synthetic aluminas and mullite)..... do..	23.8	26.4	10.9	10.8
32970 66	Extra-high alumina phosphate bonded plastics and ramming mixes (made predominantly of fused or synthetic aluminas and mullite)..... do..	13.6	14.4	11.5	13.0
32970 69	Other nonclay plastics refractories and ramming mixes (forsterite, zircon, etc.)..... do..	47.5	28.7	21.7	15.6
32970 68	Extra-high alumina castables (hydraulic setting) (made predominantly of fused or synthetic alumina and mullite)..... do..	17.6	16.9	9.8	9.8
32970 93	Other nonclay refractory castables (hydraulic setting)..... do..	6.6	5.6	5.5	4.7
	Gunning mixes:				
32970 71	Basic nonclay gunning mixes, including chrome, chrome-magnesia, magnesia-chrome, magnesia, and dolomite..... 1,000 s tons..	(D)	(D)	235.2	78.0
32970 73	Other nonclay gunning mixes (forsterite, zircon, etc.)..... do..	(D)	(D)	2.9	1.1
	Ceramic refractory fibers:				
32970 75	1500 to 2000 degrees F..... 1,000 s tons..	(D)	(D)	(X)	(NA)
32970 78	2001 to 2400 degrees F..... do..	17.8	43.0	(X)	(NA)
32970 80	2401 to 2700 degrees F..... do..	(D)	(D)	(X)	(NA)
32970 83	2701 to 3000 degrees F..... do..	(D)	(D)	(X)	(NA)
32970 85	3001 degrees F or above..... do..	(D)	(D)	(X)	(NA)
	Other nonclay refractory materials in lump or ground form, including ground silica:				
32970 94	Domestic shipments for direct use by customers as unfinished refractory and all exported material..... 1,000 s tons..	81.3	24.1	153.6	21.1
32970 96	All other domestic shipments of nonclay refractory materials sold in lump or ground form as a refractory raw material..... do..	115.5	20.4	97.8	14.0
32970 00	Nonclay refractories, n.s.k.	(X)	31.3	(X)	18.5
	Dead-burned magnesia or magnesite:				
32950 23	Domestic shipments for direct use as finished refractory products and all exported material..... 1,000 s tons..	162.1	39.3	(D)	(D)
32950 25	All other domestic shipments predominantly for use as a refractory raw material..... do..	(D)	(D)	232.0	66.9

Table 6b. Product Classes—Value of Shipments by All Producers for Specified States: 1987 and 1982

[Million dollars. Product classes covered are those that are economically significant and whose production is geographically dispersed, provided dispersion is not approximated by data in table 2. Also, product classes are not shown if they are miscellaneous or "not specified by type" classes. Statistics for some States are withheld because they are either less than \$2 million in product class shipments or they disclose data for individual companies in 1987. For meaning of abbreviations and symbols, see introductory text. For comparability of product classes and product codes between 1982 and 1987 and explanation of terms, see appendixes]

Product class and geographic area	1987 value of product shipments	1982 value of product shipments	Product class and geographic area	1987 value of product shipments	1982 value of product shipments
32915, NONMETALLIC SIZED GRAINS, POWDERS, AND FLOUR ABRASIVES			32917, NONMETALLIC COATED ABRASIVE PRODUCTS AND BUFFING WHEELS, POLISHING WHEELS, AND LAPS—Con.		
United States	413.2	409.7	North Carolina	27.5	18.2
California	24.0	(NA)	Ohio	45.2	27.5
Massachusetts	83.1	63.7			
New York	98.7	96.2	32918, METAL ABRASIVES (INCLUDING SCOURING PADS)		
Pennsylvania	11.9	23.4	United States	204.2	173.9
32916, NONMETALLIC ABRASIVE PRODUCTS			Ohio	44.7	55.1
United States	657.2	610.8			
California	12.9	47.4	32961, MINERAL WOOL FOR THERMAL AND ACOUSTICAL ENVELOPE INSULATION		
Connecticut	21.2	(NA)	United States	2 180.0	1 556.0
Illinois	73.8	50.6	California	242.8	197.6
Michigan	36.1	36.0	Georgia	319.3	(NA)
New Jersey	20.4	21.3	Indiana	148.1	43.4
New York	44.6	62.3	Kansas	230.1	(NA)
Ohio	66.6	66.2	New Jersey	160.3	(NA)
Pennsylvania	22.4	25.8	Pennsylvania	221.5	(NA)
			Texas	146.3	(NA)
32917, NONMETALLIC COATED ABRASIVE PRODUCTS AND BUFFING WHEELS, POLISHING WHEELS, AND LAPS			32962, MINERAL WOOL FOR INDUSTRIAL, EQUIPMENT, AND APPLIANCE INSULATION		
United States	1 286.2	843.1	United States	786.8	625.7
California	16.0	4.5	California	63.0	(NA)
Massachusetts	20.5	14.3	Georgia	25.0	(NA)
Michigan	22.7	20.5	Indiana	84.9	(NA)

Table 6c. Historical Statistics for Product Classes—Value Shipped by All Producers: 1987 and Earlier Years

[Million dollars. For meaning of abbreviations and symbols, see introductory text. For comparability of product classes and product codes between 1982 and 1987 and explanation of terms, see appendixes]

1987 product code	Product class	1987	1986 ¹	1985 ¹	1984 ¹	1983 ¹	1982	1977	1972
3291-	Abrasive products	2 871.6	2 762.5	2 843.3	2 907.1	2 304.6	2 135.7	1 721.8	892.3
32915	Nonmetallic sized grains, powders, and flour abrasives	413.2	456.7	495.8	540.0	364.6	409.7	(NA)	(NA)
32916	Nonmetallic abrasive products	657.2	701.9	708.3	708.4	603.8	610.8	797.9	449.6
32917	Nonmetallic coated abrasive products and buffing wheels, polishing wheels, and laps	1 286.2	1 218.5	1 292.2	1 306.5	1 049.3	843.1	627.8	293.9
32918	Metal abrasives (including scouring pads)	204.2	200.7	202.5	209.9	185.6	173.9	176.8	107.4
32910	Abrasive products, n.s.k.	310.8	184.6	144.4	142.3	101.3	98.3	119.2	41.4
3292-	Asbestos products	389.7	457.6	587.2	627.1	724.2	841.0	960.1	742.6
32922	Asbestos friction materials	275.0	324.2	355.3	380.3	302.2	276.5	271.7	209.5
32927	Other asbestos products	74.2	(D)	204.6	218.0	404.6	544.2	661.2	(NA)
32920	Asbestos products, n.s.k.	40.5	(D)	27.2	28.7	17.4	20.3	27.0	5.3
3295-	Minerals and earths, ground or otherwise treated	1 344.8	1 184.6	1 114.6	1 190.7	1 374.5	1 252.9	911.0	391.5
32950	Minerals and earths, ground or otherwise treated	1 344.8	1 184.6	1 114.6	1 190.7	1 374.5	1 252.9	911.0	391.5
3296-	Mineral wool	3 145.9	3 170.0	3 035.6	2 907.9	2 452.7	2 215.2	1 684.0	738.7
32961	Mineral wool for thermal and acoustical envelope insulation	2 180.0	2 331.7	2 193.2	2 087.7	1 781.9	1 556.0	1 098.9	(NA)
32962	Mineral wool for industrial, equipment, and appliance insulation	786.8	793.6	789.2	778.5	637.5	625.7	568.9	(NA)
32960	Mineral wool, n.s.k.	179.0	44.7	53.2	41.7	33.4	33.4	16.0	8.2
3297-	Nonclay refractories	972.4	886.6	900.7	869.2	688.0	715.8	734.0	372.1
32970	Nonclay refractories, except dead-burned magnesia	972.4	886.6	900.7	869.2	688.0	715.8	734.0	372.1
3299-	Nonmetallic mineral products, n.e.c.	597.6	663.4	622.7	591.0	398.0	453.8	391.1	169.7
32990	Other nonmetallic mineral products, n.e.c.	597.6	663.4	622.7	591.0	398.0	453.8	391.1	169.7

¹Figures are estimates derived from a representative sample of manufacturing establishments. Standard errors associated with estimates are published in annual survey of manufactures publications for this period.

Table 7. **Materials Consumed by Kind: 1987 and 1982**

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendixes. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987		1982	
		Quantity ¹	Delivered cost (million dollars)	Quantity ¹	Delivered cost (million dollars)
INDUSTRY 3291, ABRASIVE PRODUCTS					
	Materials, parts, containers, and supplies	(X)	1 384.1	(X)	1 033.9
149941	Natural abrasive materials	(X)	29.8	(X)	37.1
281950	Aluminum oxide	**208.7	103.7	(S)	108.1
281992	Silicon carbide	**94.6	51.3	(S)	83.1
281962	Alumina zirconia	(S)	23.4	(S)	17.0
190039	Diamond	(S)	26.9	(S)	14.8
281998	Cubic boron nitride	(S)	7.3	*685.9	1.5
280009	Other industrial chemicals	(X)	105.1	(X)	26.4
289101	Glues and adhesives	(S)	39.3	(S)	72.7
220101	Cotton and manmade fiber fabrics, broadwoven and narrow woven	(X)	105.0	(X)	87.0
260001	Paper and paperboard products	(X)	113.6	(X)	80.7
970099	All other materials and components, parts, containers, and supplies	(X)	640.8	(X)	402.8
971000	Materials, parts, containers, and supplies, n.s.k. ²	(X)	137.9	(X)	102.7
INDUSTRY 3292, ASBESTOS PRODUCTS					
	Materials, parts, containers, and supplies	(X)	157.4	(X)	381.3
149971	Asbestos, crude, including fiber	(S)	16.6	*246.1	64.9
324101	Portland cement	(S)	3.3	**152.4	10.1
249941	Cork products	(X)	-	(X)	(D)
262190	Building paper and board	(X)	(D)	(X)	-
280023	Pigment, organic and inorganic	(D)	(D)	11.5	7.2
282104	Plastics resins consumed in the form of granules, pellets, powders, liquids, etc., but excluding sheets, rods, tubes, and shapes	(D)	(D)	194.3	61.2
282202	Synthetic rubber	(D)	(D)	29.4	2.1
083111	Natural rubber	(D)	(D)	(D)	(D)
306902	Fabricated rubber products, except tires, tubes, hose, belting, and gaskets	(X)	(D)	(X)	-
331018	Tin plate, terne plate, and black plate	-	-	-	-
335002	Nonferrous metal mill shapes and forms	-	-	(D)	(D)
349012	Fabricated wire products, including springs and spring wire	(D)	(D)	-	-
970099	All other materials and components, parts, containers, and supplies	(X)	114.1	(X)	183.8
971000	Materials, parts, containers, and supplies, n.s.k. ²	(X)	13.2	(X)	47.4
INDUSTRY 3295, MINERALS, GROUND OR TREATED					
(Material data were not collected for this industry.)					
INDUSTRY 3296, MINERAL WOOL					
	Materials, parts, containers, and supplies	(X)	951.1	(X)	733.5
145501	Clay	-	8.4	(X)	3.4
147001	Barite, borate, potash, fluorspar, and rocksalt	(X)	(D)	(X)	33.1
220101	Cotton and manmade fiber fabrics, broadwoven and narrow woven	(X)	20.0	(X)	5.5
267420	Paper shipping sacks	(D)	(D)	(S)	10.4
265001	Paperboard containers and boxes, including folding corrugated, fiber, and set-up	(S)	17.3	(S)	15.8
260001	All other paper and paperboard products	(X)	35.8	(X)	49.9
281000	Industrial inorganic chemicals	(X)	55.8	(X)	66.2
282104	Plastics resins consumed in the form of granules, pellets, powders, liquids, etc., but excluding sheets, rods, tubes, and shapes	(S)	33.3	217.8	45.6
308007	Plastics products consumed in the form of sheets, rods, tubes, and other shapes	(X)	48.2	(X)	15.2
289101	Glues and adhesives	(S)	34.3	(S)	22.0
322931	Glass fiber (textile type, bonded mat type, etc.)	(S)	69.0	(S)	47.9
329103	Abrasives and miscellaneous nonmetallic minerals products	(X)	(D)	(X)	13.6
331212	Crude blast furnace slag	(S)	34.0	2 123.3	18.4
335301	Aluminum sheet, plate, and foil	*10.0	12.2	4.0	7.9
349702	Converted aluminum foil	(S)	22.2	(S)	20.4
970099	All other materials and components, parts, containers, and supplies	(X)	311.9	(X)	307.0
971000	Materials, parts, containers, and supplies, n.s.k. ²	(X)	104.8	(X)	51.1
INDUSTRY 3297, NONCLAY REFRACTORIES					
	Materials, parts, containers, and supplies	(X)	367.5	(X)	277.8
145001	Clay, ceramic, and refractory minerals	(S)	105.8	291.7	52.2
329502	Dead-burned magnesia or magnesite	163.1	38.4	200.1	65.4
320591	Refractories, clay or nonclay	(S)	41.4	(S)	47.8
280001	Industrial chemicals	(X)	10.1	(X)	6.6
970099	All other materials and components, parts, containers, and supplies	(X)	117.5	(X)	974.2
971000	Materials, parts, containers, and supplies, n.s.k. ²	(X)	54.3	(X)	31.6

See footnotes at end of table.

Table 7. Materials Consumed by Kind: 1987 and 1982—Con.

(Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendixes. For meaning of abbreviations and symbols, see introductory text)

1987 material code	Material	1987		1982	
		Quantity ¹	Delivered cost (million dollars)	Quantity ¹	Delivered cost (million dollars)
	INDUSTRY 3299, NONMETALLIC MINERAL PRODUCTS, N.E.C.				
	(Material data were not collected for this industry.)				

¹For some establishments, data have been estimated from control unit values which are based on quantity-cost relationships of reported data. The following symbols are used when percentage of each quantity figure estimated in this manner equals or exceeds 10 percent of published figure: * 10 to 19 percent estimated; ** 20 to 29 percent estimated. If 30 percent or more is estimated, figure is replaced by (S).

²Total cost of materials of establishments that did not report detailed materials data, including establishments that were not mailed a form.



APPENDIX A.

Explanation of Terms

This appendix is in two sections. Section 1 includes items requested of all establishments mailed census of manufactures forms including annual survey of manufactures (ASM) forms. Note that this section also includes several items (number of establishments and companies, value added, classes of products, and specialization and coverage ratios) not included on the report forms but derived from information collected on the forms. Section 2 covers supplementary items requested only from establishments included in the ASM sample. Results of the supplementary ASM inquiries are included in table 3c of this report.

SECTION 1. ITEMS COLLECTED OR DERIVED BASED ON ALL CENSUS OF MANUFACTURES (INCLUDING ASM) REPORT FORMS

Number of establishments and companies—As discussed in the Introduction, a separate report was required for each manufacturing establishment (plant) with one employee or more. An establishment is defined as a single physical location where manufacturing is performed. A company, on the other hand, is defined as a business organization consisting of one establishment or more under common ownership or control.

If the company operated at different physical locations, even if the individual locations were producing the same line of goods, a separate report was requested for each location. If the company operated in two or more distinct lines of manufacturing at the same location, a separate report was requested for each activity.

An establishment not in operation for any portion of the year was requested to return the report form with the proper notation in the "Operational Status" section of the form. In addition, the establishment was requested to report data on any employees, capital expenditures, inventories, or shipments from inventories during the year.

In this report, data are shown for establishments in operation at any time during the year. A comparison with the number of establishments in operation at the end of the year will be provided in the Introduction of the General Summary subject report.

Employment and related items—The report forms requested separate information on production workers for a specific payroll period within each quarter of the year and on other employees as of the payroll period which included the 12th of March.

All employees—This item includes all full-time and part-time employees on the payrolls of operating manufacturing establishments during any part of the pay period which included the 12th of the months specified on the report form. Included are all persons on paid sick leave, paid holidays, and paid vacations during these pay periods.

Officers of corporations are included as employees; proprietors and partners of unincorporated firms are excluded. The "all employees" number is the average number of production workers plus the number of other employees in mid-March. The number of production workers is the average for the payroll periods including the 12th of March, May, August, and November.

Production workers—This item includes workers (up through the line-supervisor level) engaged in fabricating, processing, assembling, inspecting, receiving, storing, handling, packing, warehousing, shipping (but not delivering), maintenance, repair, janitorial and guard services, product development, auxiliary production for plant's own use (e.g., power plant), recordkeeping, and other services closely associated with these production operations at the establishment covered by the report. Employees above the working-supervisor level are excluded from this item.

All other employees—This item covers nonproduction employees of the manufacturing establishment including those engaged in factory supervision above the line-supervisor level. It includes sales (including driver salespersons), sales delivery (highway truck drivers and their helpers), advertising, credit, collection, installation and servicing of own products, clerical and routine office function, executive, purchasing, financing, legal, personnel (including cafeteria, medical, etc.), professional, and technical employees. Also included are employees on the payroll of the manufacturing establishment engaged in the construction of major additions or alterations to the plant and utilized as a separate work force.

In addition to reports sent to operating manufacturing establishments, information on employment during the payroll period which included March 12 and annual payrolls also was requested of auxiliary units (e.g., administrative offices, warehouses, and research and development laboratories) of multiestablishment companies. However, these figures are not included in the totals for individual

industries shown in this report. They are included in the general summary and geographic area reports as a separate category.

Payroll—This item includes the gross earnings of all employees on the payroll of operating manufacturing establishments paid in the calendar year 1987. Respondents were told they could follow the definition of payrolls used for calculating the Federal withholding tax. It includes all forms of compensation, such as salaries, wages, commissions, dismissal pay, bonuses, vacation and sick leave pay, and compensation in kind, prior to such deductions as employees' Social Security contributions, withholding taxes, group insurance, union dues, and savings bonds. The total includes salaries of officers of corporations; it excludes payments to proprietors or partners of unincorporated concerns. Also excluded are payments to members of Armed Forces and pensioners carried on the active payroll of manufacturing establishments.

The census definition of payrolls is identical to that recommended to all Federal statistical agencies by the Office of Management and Budget. It should be noted that this definition does not include employers' Social Security contributions or other nonpayroll labor costs, such as employees' pension plans, group insurance premiums, and workers' compensation.

The ASM provides estimates of employers' supplemental labor costs, both those required by Federal and State laws and those incurred voluntarily or as part of collective bargaining agreements. (Supplemental labor costs are explained later in this appendix.)

As in the case of employment figures, the payrolls of separate auxiliary units of multiestablishment companies are not included in the totals for individual industries or industry groups.

Production-worker hours—This item covers hours worked or paid for at the plant, including actual overtime hours (not straight-time equivalent hours). It excludes hours paid for vacations, holidays, or sick leave.

Cost of materials—This term refers to direct charges actually paid or payable for items consumed or put into production during the year, including freight charges and other direct charges incurred by the establishment in acquiring these materials. It includes the cost of materials or fuel consumed, whether purchased by the individual establishment from other companies, transferred to it from other establishments of the same company, or withdrawn from inventory during the year.

The important components of this cost item are (1) all raw materials, semifinished goods, parts, containers, scrap, and supplies put into production or used as operating supplies and for repair and maintenance during the year, (2) electric energy purchased, (3) fuels consumed for heat, power, or the generation of electricity, (4) work done by

others on materials or parts furnished by manufacturing establishments (contract work), and (5) products bought and resold in the same condition. (See discussion of duplication of data below.)

Specific materials consumed—In addition to the total cost of materials, which every establishment was required to report, information also was collected for most manufacturing industries on the consumption of major materials used in manufacturing. The inquiries were restricted to those materials which were important parts of the cost of production in a particular industry and for which cost information was available from manufacturers' records. Information on the establishments consuming less than a specified amount (usually \$10,000) of a specific material were not requested to report consumption of that material separately. Also, the cost of materials for the small establishments for which either administrative records or short forms were used was imputed as "not specified by kind." (See the introduction for the importance of administrative records in the industry.)

Value of shipments—This item covers the received or receivable net selling values, f.o.b. plant (exclusive of freight and taxes), of all products shipped, both primary and secondary, as well as all miscellaneous receipts, such as receipts for contract work performed for others, installation and repair, sales of scrap, and sales of products bought and resold without further processing. Included are all items made by or for the establishments from materials owned by it, whether sold, transferred to other plants of the same company, or shipped on consignment. The net selling value of products made in one plant on a contract basis from materials owned by another was reported by the plant providing the materials.

In the case of multiunit companies, the manufacturer was requested to report the value of products transferred to other establishments of the same company at full economic or commercial value, including not only the direct cost of production but also a reasonable proportion of "all other costs" (including company overhead) and profit. (See discussion of duplication of data below.)

Individual products—As in previous censuses, data were collected for most industries on the quantity and value of individual products shipped. In the 1987 census program, information was collected on the output of approximately 11,000 individual product items. The term "product", as used in the census of manufactures, represents the finest level of detail for which output information was requested. Consequently, it is not necessarily synonymous with the term "product" as used in the marketing sense. In some cases, it may be much more detailed and, in other cases, it is more aggregative. For example, "pharmaceutical preparations" was distributed into over 100 terms; whereas, "motor gasoline" was reported as a single item.

Approximately 6,600 of the product items were listed separately on the 1987 census report forms. Data for

about 4,400 products were obtained in the monthly, quarterly, or annual surveys comprising the Current Industrial Reports series of the Census Bureau. Totals for the year 1987 for these items, as derived from the commodity surveys, are shown in the "products shipped" table (table 6a-2).

The list of products for which separate information was collected was prepared after consultation with industry and government representatives. Comparability with previous figures was given considerable weight in the selection of product categories so that comparable 1982 information is presented for most products.

Typically, both quantity and value of shipments information were collected. However, if quantity was not significant or could not be reported by manufacturers, only value of shipments was collected.

Shipments include both commercial shipments and transfers of products to other plants of the same company. For industries in which a considerable portion of the total shipments is transferred to other plants of the same company, separate information on interplant transfers also was collected. Moreover, for products that are used to a large degree within the same establishment as materials or components in the fabrication of other products, total production and often consumption of the item within the plant was collected. Typically, the information on production also was collected for products for which there are significant differences between total production and shipments in a given year because of wide fluctuations in finished goods inventories. Other measures of output of products with long production cycles were used as appropriate and feasible.

Classes of products—To summarize the product information, the separate products were aggregated into classes of products that, in turn, were grouped into all primary products of each industry. The code structure used is a seven-digit number for the individual product, a five-digit number for the class of product, and a four-digit number for the total primary products in an industry. (See Introduction, Industry Classification of Establishments, for application of the coding structure to the assignment of SIC codes for establishments.)

In the 1987 census, the 11,000 products were grouped into approximately 1,500 separate classes on the basis of general similarity of manufacturing processes, types of materials used, and the like. However, the grouping of products was affected by the economic significance of the class and, in some cases, dissimilar products were grouped because the products were not sufficiently significant to warrant separate classes.

Duplication in cost of materials and value of shipments—The aggregate of the cost of materials and value of shipments figures for industry groups and for all manufacturing industries includes large amounts of duplication since the products of some industries are used as materials by others. This duplication results, in part, from the

addition of related industries representing successive stages in the production of a finished manufactured product. Examples are the addition of flour mills to bakeries in the food group and the addition of pulp mills to paper mills in the paper and allied products group of industries. Estimates of the overall extent of this duplication indicate that the value of manufactured products exclusive of such duplication (the value of finished manufactures) tends to approximate two-thirds of the total value of products reported in the annual survey.

Duplication of products within individual industries is significant within a number of industry groups, e.g., machinery and transportation industries. These industries frequently include complete machinery and their parts. In this case, the parts made for original equipment are materials consumed for assembly plants in the same industry.

Even when no significant amount of duplication is involved, value of shipments figures are deficient as measures of the relative economic importance of individual manufacturing industries or geographic areas because of the wide variation in ratio of materials, labor, and other processing costs of value of shipments, both among industries and within the same industry.

Before 1962, cost of materials and value of shipments were not published for some industries which included considerable duplication. Since then, these data have been published for all industries at the United States level and beginning in 1964, for all geographic levels.

Value added by manufacture—This measure of manufacturing activity is derived by subtracting the cost of materials, supplies, containers, fuel, purchased electricity, and contract work from the value of shipments (products manufactured plus receipts for services rendered). The result of this calculation is adjusted by the addition of value added by merchandising operations (i.e., the difference between the sales value and the cost of merchandise sold without further manufacture, processing, or assembly) plus the net change in finished goods and work-in-process between the beginning- and end-of-year inventories.

For those industries where value of production is collected instead of value of shipments (see footnote in table 1a), value added is adjusted only for the change in work-in-process inventories between the beginning and end of year. For those industries where value of work done is collected, the value added does not include an adjustment for the change in finished goods or work-in-process inventories.

"Value added" avoids the duplication in the figure for value of shipments that results from the use of products of some establishments as materials by others. Value added is considered to be the best value measure available for comparing the relative economic importance of manufacturing among industries and geographic areas.

New and used capital expenditures—For establishments in operation and any known plants under construction, manufacturers were asked to report their new expenditures for (1) permanent additions and major alterations to

manufacturing establishments, and (2) machinery and equipment used for replacement and additions to plant capacity if they were of the type for which depreciation accounts were ordinarily maintained.

The totals for new expenditures include expenditures leased from nonmanufacturing concerns through capital leases, new facilities owned by the Federal Government but operated under contract by private companies, and plant and equipment furnished to the manufacturer by communities and nonprofit organizations. Also excluded are expenditures for used plant and equipment (although reported in the census), expenditures for land, and cost of maintenance and repairs charged as current operating expenses.

Manufacturers also were requested to report the value of all used buildings and equipment purchased during the year at the purchase price. For any equipment or structure transferred for the use of the reporting establishment by the parent company or one of its subsidiaries, the value at which it was transferred to the establishment was to be reported. Furthermore, if the establishment changed ownership during the year, the cost of the fixed assets (building and equipment) was to be reported under used capital expenditures.

Total expenditures for used plant and equipment is a universe figure; it is collected on all census forms. However, the breakdown of this figure between expenditures for used buildings and other structures and expenditures for used machinery and equipment is collected only on the ASM form. The data for total new capital expenditures, new building expenditures, and new machinery expenditures, as well as the data for total used expenditures, are shown in table 3b.

End-of-year inventories—Respondents were asked to report their 1986 and 1987 end-of-year inventories at cost or market. Effective with the 1982 Economic Censuses, this change to a uniform instruction for reporting inventories was introduced for all sector reports. Prior to 1982, respondents were permitted to value inventories using any generally accepted accounting method (FIFO, LIFO, market, to name a few). In 1982, LIFO users were asked to first report inventory values prior to the LIFO adjustment and then to report the LIFO reserve and the LIFO value after adjustment for the reserve.

SECTION 2. ITEMS COLLECTED ONLY ON ASM REPORT FORMS

The following items were collected only from establishments included in the ASM sample:

1. **Supplemental labor costs**—Supplemental labor costs are divided into legally required expenditures and payments for voluntary programs. The legally required portion consists primarily of Federal old age and survivors' insurance, unemployment compensation, and workers' compensation. Payments for voluntary programs include all programs not

Because of this change in reporting instructions, the 1982 through 1987 data for inventories and value added by manufacture included in the tables of this report are not comparable to the prior-year data shown in table 1a of this report and in historical census of manufactures and annual survey of manufactures publications.

In using inventory data by stage of fabrication for "all industries" and at the two-digit industry level, it should be noted that an item treated as a finished product by an establishment in one industry may be reported as a raw material by another establishment in a different industry. For example, the finished-product inventories of a steel mill would be reported as raw materials by a stamping plant. Such differences are present in the inventory figures by stage of fabrication shown for individual industries, industry groups, and "all manufacturing", which are aggregates of figures reported by establishments in specified industries.

Specialization and coverage ratios—These items are not collected on the report forms but are derived from the data shown in table 5b. An establishment is classified in a particular industry if its shipments of primary products of that industry exceed in value its shipments of the products of any other single industry.

As noted in the introduction, an establishment's shipments include those products assigned to an industry (primary products), those considered primary to other industries (secondary products), and receipts for miscellaneous activities (merchandising, contract work, resales, etc.). Specialization and coverage ratios have been developed to measure the relationship of primary product shipments to the data on shipments for the industry shown in tables 1a through 5a and data on product shipments shown in tables 6a through 6c.

Specialization ratio represents the ratio of primary product shipments to total product shipments (primary and secondary, excluding miscellaneous receipts) for the establishments classified in the industry.

Coverage ratio represents the ratio of primary products shipped by the establishments classified in the industry to the total shipments of such products that are shipped by all manufacturing establishments wherever classified.

specifically required by legislation whether they were employer initiated or the result of collective bargaining. They include the employer portion of such plans as insurance premiums, premiums for supplemental accident and sickness insurance, pension plans, supplemental unemployment compensation, welfare plans, stock purchase plans on which the employer payment is not subject to withholding tax, and deferred profit-sharing plans.

They exclude such items as company-operated cafeterias, in-plant medical services, free parking lots, discounts on employee purchases, and uniforms and work clothing for employees. While the excluded items do benefit employees and all or part of their cost generally is similar to the items covered in the ASM labor costs statistics, accounting records generally do not provide reliable figures on net employee benefits of these types.

2. **Retirements of depreciable assets**—Included in this item is the gross value of assets sold, retired, scrapped, destroyed, etc., during 1987. When a complete operation or establishment changed ownership, the respondent was instructed to report the value of the assets sold at the original cost as recorded in the books of the seller. The respondent also was requested to report retirements of equipment or structures owned by a parent company that the establishment was using as if it were a tenant.
3. **Depreciation charges for fixed assets**—This item includes depreciation and amortization charged during the year against assets. Depreciation charged against fixed assets acquired since the beginning of the year and against assets sold or retired during the year are components of this category. Respondents were requested to make certain that they did not report accumulated depreciation.
4. **Rental payments**—Total rental payments is collected on all census forms. However, the breakdown between rental payments for buildings and other structures and rental payments for machinery and equipment is collected only on the ASM forms. This item includes rental payments for the use of all items for which depreciation reserves would be maintained if they were owned by the establishment, e.g., structures and buildings, and production, office, and transportation equipment. Excluded are royalties and other payments for the use of intangibles and depletable assets, and land rents where separable.

When an establishment of a multiestablishment company was charged rent by another part of the same company for the use of assets owned by the company, it was instructed to exclude that cost from rental payments. However, the book value (original cost) of these company-owned assets was to be reported as assets of the establishment at the end of the year.

If there were assets at an establishment rented from another company and the rents were paid centrally by the head office of the establishment, the company was instructed to report these rental payments as if they were paid directly by the establishment.

5. **Depreciable assets**—Total value of gross depreciable assets is collected on all census forms.

However, the detail for depreciable assets is collected only on the ASM forms. The data encompass all fixed depreciable assets on the books of establishments at the beginning and end of the year. The values shown (book value) represent the actual cost of assets at the time they were acquired, including all costs incurred in making the assets usable (such as transportation and installation). Included are all buildings, structures, machinery, and equipment (production, office, and transportation equipment) for which depreciation reserves are maintained. Excluded are nondepreciable capital assets, including inventories and intangible assets, such as timber and mineral rights.

The definition of fixed depreciable assets is consistent with the definition of capital expenditures. For example, expenditures include actual capital outlays during the year, rather than the final value of equipment put in place and buildings completed during the year. Accordingly, the value of assets at the end of the year includes the value of construction in progress. In addition, respondents were requested to make certain that assets at the beginning of the year plus new and used capital expenditures, less retirements, equalled assets at the end of the year.

6. **New and used capital expenditures**—The data for total new capital expenditures, new building expenditures, new machinery expenditures, and total used capital expenditures are collected on all census forms. However, the breakdown between expenditures for used buildings and other structures and expenditures for used machinery and equipment is collected only on the ASM form. (See further explanation on capital expenditures in section 1.)
7. **Quantity of electric energy consumed for heat and power**—Data on the cost of purchased electric energy were collected on all census forms. However, data on the quantity of purchased electric energy were collected only on the ASM forms. In addition, information was collected on the quantity of electric energy generated by the establishment and the quantity of electric energy sold or transferred to other plants of the same company.
8. **Breakdown of new capital expenditures for machinery and equipment**—ASM establishments were requested to separate their capital expenditures for new machinery and equipment into (1) automobiles, trucks, etc., for highway use, (2) computers and peripheral data processing equipment, and (3) all other.

The category "automobiles, trucks, etc., for highway use" is intended to measure expenditures for vehicles designed for highway use that were acquired through a purchase or lease-purchase agreement.

Vehicles normally operating off public highways (vehicles specifically designed to transport materials, property, or equipment on mining, construction, logging, and petroleum development projects) are excluded from this item.

9. **Foreign content of cost of materials**—Establishments included in the ASM sample panel were requested to provide information on foreign-made materials purchased or transferred from foreign sources. This includes materials acquired from a central warehouse or other domestic establishment of the same company but made in an operation outside of the 50 States, District of Columbia, Puerto Rico, or U.S. territories.
10. **Cost of purchased services**—ASM establishments were requested to provide information on the cost of purchased services for the repair of buildings and other structures, the repair of machinery, and communication services. Included in the cost of purchased services for the repair of buildings and machinery are payments made for all maintenance and repair work on buildings and equipment, such as painting, roof repairs, replacing parts, and overhauling equipment. Such payments made to other establishments of the same company and for repair and maintenance of any leased property also are included. Extensive repairs or reconstruction that were capitalized are considered capital expenditures for used buildings and machinery and are, therefore, excluded from this item. Repair and maintenance costs provided by an owner as part of a rental contract or incurred directly by an establishment in using its own work force also are excluded.

Three basic approaches were utilized to produce these statistics.

1. For items 1 through 6, data were estimated (imputed) for all non-ASM establishments using the available data in the establishment record and industry-based parameters. The statistics were then generated by simply tabulating all census records including the imputed value for non-ASM establishments and the unweighted value for ASM establishments. Separate imputation rates were developed and are shown in the table. For quantity of purchased electricity for heat and power (item 7), a similar procedure was used; however, the imputation parameters were geographically-based instead of industry-based. For quantities of generated less sold electricity, no imputation was performed for non-ASM establishments. The estimates for these items are simply tabulations of unweighted ASM values.

Since the published statistics for these items were developed from the complete census universe and not just the ASM establishments, there are no sampling variances associated with these statistics. However, there is an unknown level of bias for each of the items due to the imputation of the non-ASM establishments. This bias is felt to be small due to the strong correlation between the items being imputed and the collected items that were used to generate the impute values.

2. For items 8 and 9, the estimates were developed using a ratio estimation methodology. For item 8, an estimate of the breakout of new capital expenditures for machinery and equipment into the three categories was made from ASM establishments reporting these categories. The estimated proportions were then applied to the corresponding Census value for new capital expenditures for machinery and equipment to produce the estimates.

The estimates for item 9, foreign content of cost of materials, were developed in a similar manner based on costs of parts, supplies, and components (item 5a) as the control total for the three categories.

For items 8 and 9, an adjustment ratio of the following form was computed.

$$R_j = \frac{NM_c}{TME_{asm}}$$

where:

NM_c = the census value of new capital expenditures for machinery and equipment

TME_{asm} = the weighted ASM value of new capital expenditures for machinery and equipment from reporters of the detailed breakout data

3. For item 10, cost of purchased services, the estimates were made by simply tabulating weighted data for all the ASM records that reported the item. A response coverage ratio (a measure of the extent to which respondents reported for each item) is shown in table 3c for the three types of services. It is derived for each item by calculating the ratio of the weighted employment (establishment data multiplied by sample weight, see appendix B) for those ASM establishments that reported the specific inquiry to the weighted total employment for all ASM establishments classified in the industry.

APPENDIX B.

Annual Survey of Manufactures (ASM) Sampling and Estimating Methodologies

DESCRIPTION OF SURVEY SAMPLE

The Annual Survey of Manufactures (ASM) contains two components. The mail portion of the survey is a probability sample of about 56,000 manufacturing establishments selected from a total of about 220,000 establishments. These 220,000 establishments represent all manufacturing establishments of multiunit companies and all single establishment companies mailed schedules in the 1982 Census of Manufactures. This mail portion is supplemented annually by a Social Security Administration list of new manufacturing establishments opened after 1982 and a list of new multiunit manufacturing establishments identified from the Census Bureau's Company Organization Survey.

The 1984 through 1988 ASM sample differs slightly from the previous sample. For the current panel, all establishments of companies with 1982 shipments in manufacturing in excess of \$500 million were included in the survey panel with certainty. There are approximately 500 such companies collectively accounting for approximately 18,000 establishments. For the remaining portion of the mail survey, the establishment was defined as the sampling unit. For this portion, all establishments with 250 employees or more and establishments with a very large value of shipments also were included in the survey panel with certainty. A total of 12,100 establishments were selected from this portion of the universe with certainty. Therefore, of the 56,000 manufacturing establishments included in the ASM panel, approximately 31,000 are selected with certainty. These certainty establishments collectively account for approximately 80 percent of the total value of shipments in the 1982 census.

Smaller establishments in the remaining portion of the mail survey were sampled with probabilities ranging from 0.999 to 0.005 in accordance with mathematical theory for optimum allocation of a sample. The probabilities of selection assigned to the smaller establishments were proportional to measures of size determined for each establishment. The measures of size depend directly upon each establishment's 1982 product class values and the historic variability of the year-to-year shipments of each product class. Product classes displaying more volatile year-to-year change in shipments at the establishment level were sampled at a heavier rate.

This method of assigning measures of size was used in order to maximize the precision (that is, minimize the variance of estimates of the year-to-year change) in the value of product class shipments. Implicitly, it also gave weight differences in employment, value added, and other

general statistics, since these are highly correlated with value of shipments. Individual sample selection probabilities were obtained by multiplying each establishment's final measure of size by an overall sampling fraction coefficient calculated to yield a total expected sample size.

The sample selection procedure gave each establishment in the sampling frame an independent chance of selection. This method of independent selection permits the rotation of small establishments out of a given sample panel without introducing a bias into the survey estimates.

The nonmail portion of the survey includes all single-establishment companies that were tabulated as administrative records in the 1982 Census of Manufactures. Although this portion contained approximately 130,000 establishments, it accounted for less than 2 percent of the estimate for total value of shipments at the total manufacturing level. This portion was not sampled; rather, the data for every establishment in this group were estimated based on selected information obtained annually from the administrative records of the Internal Revenue Service and the Social Security Administration. This administrative-record information, which includes payroll, total employment, industry classification, and physical location of the establishment, was obtained under conditions which safeguard the confidentiality of both tax and census records. Estimates of data other than payroll and employment for these small establishments were developed from industry averages.

The corresponding estimates for the mail and nonmail establishments were added together, along with the base-year differences, as defined in the Description of Estimating Procedure section, to produce the figures shown in this publication.

DESCRIPTION OF ESTIMATING PROCEDURES

Most of the ASM estimates for the years 1983-1986 were computed using a difference estimation procedure. For each item, a base-year difference was developed. This base-year difference is equal to the difference between the 1982 census published number for an item total and the linear ASM estimate of the total for 1982. The ASM linear estimate was obtained by multiplying each sample establishment's data by its sample weight (the reciprocal of its probability of selection) and summing the weighted values.

These base-year differences were then added to the corresponding current-year linear estimates, which include the sum of the estimates for the mail and nonmail establishments, to produce the estimates for the years 1983-1986. Estimates developed by this procedure usually are far more reliable than comparable linear estimates developed from the current sample data alone.

The 1987 sample estimates for the purchased service items, shown in table 3c, are strictly ASM linear estimates, however, developed only from ASM establishments that reported the specific item.

The remaining estimates in table 3c, showing the breakdown of expenditures for new machinery and equipment and costs of parts (separated into purchases from foreign sources and purchases from domestic sources), were computed as ratio estimates. To do this, linear estimates of the new machinery detail items were developed from the ASM establishments and were ratio adjusted to the corresponding census total for new machinery. In a similar fashion, the ASM linear estimates of the detailed purchased materials items were ratio adjusted to the corresponding census total for cost of parts.

QUALIFICATIONS OF THE DATA

The estimates developed from the sample are apt to differ somewhat from the results of a survey covering all companies in the sampled lists but otherwise conducted under essentially the same conditions as the actual sample survey. The estimates of the magnitude of the sampling errors (the differences between the estimates obtained and the results theoretically obtained from a comparable, complete-coverage survey) are provided by the standard errors of the estimates.

The particular sample selected for the ASM is one of a large number of similar probability samples that, by chance, might have been selected under the same specifications. Each of the possible samples would yield somewhat different sets of results, and the standard errors are measures of the variation of all the possible sample estimates around the theoretical, comparable, complete-coverage values.

Estimates of the standard errors have been computed from the sample data for selected statistics in this report. They are presented in the form of relative standard errors (the standard errors divided by the estimated values to which they refer).

In conjunction with its associated estimate, the relative standard error may be used to define confidence intervals (ranges that would include the comparable, complete-coverage value for specified percentages of all the possible samples).

The complete coverage value would be included in the range:

1. From one standard error below to one standard error above the derived estimate for about two-thirds of all possible samples.
2. From two standard errors below to two standard errors above the derived estimate for about 19 of 20 of all possible samples.
3. From three standard errors below to three standard errors above the derived estimate for nearly all samples.

An inference that the comparable, complete-survey result would be within the indicated ranges would be correct in approximately the relative frequencies shown. Those proportions, therefore, may be interpreted as defining the confidence that the estimates from a particular sample would differ from complete-coverage results by as much as one, two, or three standard errors, respectively.

For example, suppose an estimated total is shown as 50,000 with an associated relative standard error of 2 percent, that is, a standard error of 1,000 (2 percent of 50,000). There is approximately 67 percent confidence that the interval 49,000 to 51,000 includes the complete-coverage total, about 95 percent confidence that the interval 48,000 to 52,000 includes the complete-coverage total and almost certain confidence that the interval 47,000 to 53,000 includes the complete coverage total.

In addition to the sample errors, the estimates are subject to various response and operational errors: errors of collection, reporting, coding, transcription, imputation for nonresponse, etc. These operational errors also would occur if a complete canvass were to be conducted under the same conditions as the survey. Explicit measures of their effects generally are not available. However, it is believed that most of the important operational errors were detected and corrected in the course of the Bureau's review of the data for reasonableness and consistency. The small operational errors usually remain. To some extent, they are compensating in the aggregated totals shown. When important operational errors were detected too late to correct the estimates, the data were suppressed or were specifically qualified in the tables.

As derived, the estimated standard errors included part of the effect of the operational errors. The total errors, which depend upon the joint effect of the sampling and operational errors, are usually of the order of size indicated by the standard error, or only moderately higher. However, for particular estimates, the total error may considerably exceed the standard errors shown.

The concept of complete coverage under the conditions prevailing for the ASM is not identical to the complete coverage of the census of manufactures, as the censuses have been conducted. Nearly all types of operational errors that affect the ASM also occur in the censuses. The ASM and the censuses, are conducted under quite different conditions, and operational errors can be better controlled in the ASM than in the censuses. As a result, for many of the census figures, the errors are of the same order of size as the total errors of the corresponding annual survey estimates. The differences between the census and ASM operating conditions also disturb, to some degree, the comparability of the ASM and census data.

Any figures shown in the tables in this publication having an associated standard error exceeding 15 percent may be of limited reliability. However, the figure may be combined with higher-level totals, creating a broader aggregate, which then may be of acceptable reliability.

APPENDIX C.

Changes in Census of Manufactures

Product Classes for 1987

[Based on revisions to the Standard Industrial Classification (SIC) Manual, definitions of some product classes were revised for 1987. Listed below are the revisions to the product classes]

1987	1982	1987	1982	1987	1982	1987	1982
30521	30411	30899 3089A	3079K pt	34919	34948	35483	36233
30522	30412	32295	32291 pt	34921	3494B	35484	35496
30523	30413	32296	32292 pt	34922	3494C	35485	35495 pt 35497
30524	30414	32297	32294 pt	34923	3494D	35533	35531 pt
30525	30415	32298	32291 pt 32292 pt 32294 pt	34924	3494E	35534	35532 pt
30534	32934	32311	32317	34925	3494F	35543	35541 35542 pt
30535	32935	32312	32317	34926	3494G	35544	35542 pt
30536	32936	32927	32928 32929	34927	3494H	35558	35557 pt
30537	32937	32961	32963 32965	3523C	35234 pt 35237 35238 pt	35561	35511
30538	32938	32962	32964 32966	3523E	35234 pt 35238 pt	35562	35512
30539	32939	33152	33152 34967	3523F	3523A 3523B	35563	35513 pt
30611	3069A pt	33391	33331	35246	35243 35245	35591	35591 35699 pt
30612	3069A pt	33392	33334	3531A	35311	35596	35595 pt
30613	3069A pt	33398	33321 33323 33399	3531B	35312	35597	35494
30614	3069B pt	33561 33562 33563	33569	3531C	35317	35599	35595 pt 36360 36362
30615	3069B pt	33630	33611	3531E	35314 pt	35616	3561C
30616	3069B pt	33640	33620 pt 33691 pt 33692 pt 33693 pt	3531F	35316	35631	35631 pt
30617	3069B pt	34234	34232 pt	3531G	35318 pt	35651	35513 pt 35514 pt 35691 pt
3069C	3069C 35557 pt	34235	34232 pt 35531 pt 35532 pt	3531H	35313 pt 35318 pt 35319 pt	35652	35513 pt 35514 pt 35691 pt
3069E	30310	34236	34233	3531K	35319 pt 35361 pt 35371 pt	35676	35672
30810	30792	34441 34443 34447 34448 34449	34446	3531M	35313 pt 35314 pt 35319 pt 35372 pt	35692	35694 35695 35696
30820	3079K pt	34461 34462 34463 34464 34465	34460	35337	35331 35332 pt	35697 35698	35699 pt
30830	3079K pt	34911 34912 34913 34914 34915 34916	3494A	35338	35332 pt	35711	35731 36629 pt
30840	30794	34917	34949	35339	35333	35712	35734 pt 35735 pt
30850	30795	34918	34947	3533A	35335	35721	35732 pt
30861 30862 30863 30864 30865 30866	30797	34919	34948	3533B	35336	35722	35734 pt 35735 pt
30870	3079K pt	35363	35361 pt	35337	35332 pt	35751	35732 pt 36612 pt
30880	3079J pt 3079K pt	35364	35362 pt	35338	35332 pt	35771	35732 pt
30891	3079J pt 3079K pt	35366	35360 pt	35339	35333	35772	35734 pt 35735 pt
30892	3079J pt 3079K pt	35373	35362 pt 35371 pt	3533A	35335	35781	35743
30893	3079J pt 3079K pt	35374	35362 pt 35372 pt	3533B	35336	35782	35744
30894	3079J pt 3079K pt	3541D	35411 35412	35363	35361 pt	35783	35745
30895	3079J pt	35430	35650	35364	35362 pt	3585C	3585A 36993
30896	2499A pt 3079J pt 3079K pt	35454	35453	35373	35362 pt 35371 pt	3585D	3585B 36994 pt
30897	3079J pt 3079K pt	35455	35452	35374	35362 pt 35372 pt		
30898	3079J pt 3079K pt	35481	36231	3541D	35411 35412		
		35482	36232	35430	35650		
				35454	35453		
				35455	35452		
				35481	36231		
				35482	36232		

[Based on revisions to the Standard Industrial Classification (SIC) Manual, definitions of some product classes were revised for 1987. Listed below are the revisions to the product classes]

1987	1982	1987	1982	1987	1982	1987	1982
35931	35996 35997	36411	36410	36991—Con. 36995	36629 pt—Con.	38731—Con.	38734—Con. 38736 38737
35932	35998	36412	36994 pt	36997	35497 pt 36629 pt	39113 39114	39112
35933	35999	36520	36521 pt	36998	36994 pt	39153 39154	39151
35941	35617 35618 35631 pt	36613	35732 pt 36612 pt	3714A	37143	39447	36629 pt 39447
35942	3561A 3561B 35631 pt	36614	36612 pt	37999	37994 37998	39493	39494 pt
35961 35962 35963	35760	36631	36621 36629 pt	38121	38111	39495	3079k pt
36123 36126	36125	36632	36622	38122	36625 pt 36629	39496	39494 pt
36251	36138 pt 36794	36691	36624	38210	38112 38113 pt	39523	39521 39522 pt
36252	36221	36692	36626	38260	38320 38326	39524	39522 pt
36253	36222	36693	36628	38271	38324	39651	39630
36254	36138 pt 36223	36714	36711 36712	38272 38273	38325	39654	39641
36330	36331 36333	36715	36799 pt	38295	36625 pt 38293	39656	39642
36395	36361 36394 36399	36720	36797	38296	38113 pt	39998	39620
		36799	36629 pt 36799 pt	38440	36931	39999	39995
		36950	35732 pt 36792	38450	36930 36933	97372	36522
		36991 36992	36629 pt	38731	38734	97819	36521 pt

APPENDIX D.

Changes in Census of Manufactures

Product Codes for 1987

[Based on revisions to the Standard Industrial Classification (SIC) Manual, definitions of some product codes were revised for 1987. Listed below are the revisions to the product codes. The terms published and collected are defined as follows: (1) published refers to the code used in the published reports for 1987 and 1982, and (2) collected refers to the code appearing on the report forms for 1987]

1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published
30118 00	30118 00	30118 19 30118 20	30539 77	32939 77	32939 77	30830 11 30830 13 30830 19	30793 01 30793 03 30793 09	3079K 90	30892 20— Con.	3079D 33— Con.	3079J 61 pt — Con. 3079J 66 pt 3079K 93 pt
3011A 39	3011A 39	3011A 33 3011A 35	30539 79	32939 79	32939 79	30840 11	30794 21	30794 21	30892 30	3079D 35	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt
3011C 29	3011C 29	3011C 24 3011C 26 3011C 27	30611 00	3069A 00	3069A 11	30840 12	30794 22	30794 22	30892 90	3079D 39	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt
30521 00	30411 00	30411 00	30612 00	3069A 00	3069A 12 3069A 15	30840 13	30794 23	30794 23	30893 00	3079F 22	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt
30522 00	30412 00	30412 00	30613 00	3069A 00	3069A 13 3069A 14 3069A 16	30840 14	30794 24	30794 24	30894 01	30798 01	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt
30523 00	30413 00	30413 00	30614 00	3069B 00	3069B 11	30840 15	30794 25	30794 25	30894 02	30798 02	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt
30524 00	30414 00	30414 00	30615 00	3069B 00	3069B 12 3069B 13 3069B 14 3069B 19	30850 00	30795 00	30795 00	30894 03	30798 03	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt
30525 00	30415 00	30415 00	30616 00	3069B 00	3069B 21	30861 00	30797 41	30797 41	30894 04	30798 04	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt
30526 00	30416 00	30416 00	30617 00	3069B 00	3069B 29	30862 10 30862 20 30862 90	30797 51 30797 53 30797 59	30797 42	30894 05	30798 05	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt
30534 11	32934 11	32934 11	30697 77	30697 77	30697 11 30697 78	30863 10 30863 90	30797 61 30797 69	30797 44	30894 06	30798 06	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt
30534 13	32934 13	32934 13	3069C 12	35558 72	35557 72	30864 10 30864 20 30864 30 30864 90	30797 71 30797 73 30797 75 30797 79	30797 45	30894 07	30798 07	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt
30534 15	32934 15	32934 15	3069C 30	35558 76	35557 76	30865 10 30865 20 30865 30 30865 40 30865 90	30797 81 30797 83 30797 85 30797 86 30797 89	30797 46	30894 09	30798 09	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt
30534 17	32934 17	32934 17	3069D 20	3069D 20	3069D 17 3069D 19	30866 10	30797 43	30797 43	30895 01	30799 01	3079J 61 pt
30535 11	32935 11	32935 11	3069D 42	3069D 42	3069D 55 3069D 58	30866 90	30797 47	30797 47			
30535 13	32935 13	32935 13	3069E 20	30310 00	30310 00	30870 12 30870 13	30791 01 30791 02	3079K 99			
30535 15	32935 15	32935 15	30810 10	30792 11	30792 10 pt 30792 20 pt 30792 30 pt 30792 40 pt 30792 50 pt 30792 60 pt 30792 70 pt	30880 00	3079F 20	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt			
30535 17	32935 17	32935 17	30810 20	30792 12	30792 10 pt 30792 20 pt 30792 30 pt 30792 40 pt 30792 50 pt 30792 60 pt 30792 70 pt	30891 01	3079C 11	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt			
30535 19	32935 19	32935 19	30810 30	30792 13	30792 10 pt 30792 20 pt 30792 30 pt 30792 40 pt 30792 50 pt 30792 60 pt 30792 70 pt	30891 03	3079C 13	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt			
30535 21	32935 21	32935 21	30810 40	30792 14	30792 10 pt 30792 20 pt 30792 30 pt 30792 40 pt 30792 50 pt 30792 60 pt 30792 70 pt	30891 09	3079C 19	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt			
30535 23	32935 23	32935 23	30810 50	30792 19	30792 10 pt 30792 20 pt 30792 30 pt 30792 40 pt 30792 50 pt 30792 60 pt 30792 70 pt	30892 10	3079D 31	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt			
30535 29	32935 29	32935 29	30820 10	30796 01	3079K 80	30892 20	3079D 33	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 93 pt			
30536 21	32936 21	32936 21	30820 20	30796 02							
30536 22	32936 22	32936 22	30820 30	30796 03							
30536 25	32936 25	32936 25	30820 40	30796 04							
30536 26	32936 26	32936 26	30820 50	30796 05							
30536 30	32936 30	32936 30	30820 60	30796 06							
30536 35	32936 35	32936 35	30820 70	30796 07							
30537 29	32937 29	32937 29	30820 80	30796 08							
30537 39	32937 39	32937 39	30820 90	30796 19							

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1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published
30895 01— Con.	30799 01— Con.	3079J 61 pt —Con. 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt	30896 22— Con.	3079A 21— Con.	3079J 61 pt —Con. 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30898 05— Con.	3079B 25— Con.	3079J 61 pt —Con. 3079J 65 pt 3079J 66 pt 3079K 94 pt 3079K 99 pt	32927 15	32927 15	32929 11 32929 21
									32927 31	32927 31	32929 31
									32927 33	32927 33	32929 33
30895 02	30799 02	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt	30896 23	3079A 23	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30898 06	3079B 26	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 94 pt 3079K 99 pt	32927 34	32927 34	32929 34
									32927 36	32927 36	32929 36
									32927 41	32927 41	32929 41
									32927 77	32927 77	32929 77
30895 03	30799 03	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt	30896 24	3079A 25	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30898 07	3079B 27	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 94 pt 3079K 99 pt	32927 78	32927 78	32929 51 32929 73 32929 75
									32927 98	32927 98	32928 13 32929 98
30896 11	3079A 11	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30896 25	3079A 27	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30898 08	3079B 28	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 94 pt 3079K 99 pt	32961 11	32961 11	32963 11 32965 11
									32961 31	32961 31	32963 31 32965 31
30896 12	3079A 12	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30896 26	3079A 28	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30898 09	3079B 29	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 94 pt 3079K 99 pt	32961 35	32961 35	32963 35 32965 35
									32961 38	32961 38	32963 38 32965 38
									32961 51	32961 51	32963 51 32965 51
30896 13	3079A 13	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30896 27	2499A 94 3079A 29	2499A 94 3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30899 00	3079F 31	3079K 88	32961 61	32961 61	32963 61 32965 61
									32961 98	32961 98	32963 98 32965 98
30896 14	3079A 14	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30897 01	3079F 25	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	3089A 11	3079F 41	3079K 93 pt 3079K 94 pt 3079K 95 pt 3079K 99 pt	32962 31	32962 31	32964 31 32966 31
									32962 34	32962 34	32964 34 32966 34
									32962 36	32962 36	32964 36 32966 36
30896 15	3079A 15	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30897 09	3079F 27	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 95 pt	3089A 14	3079F 47	3079K 93 pt 3079K 94 pt 3079K 95 pt 3079K 99 pt	32962 45	32962 45	32964 45 32966 45
									32962 51	32962 51	32964 51 32966 51
30896 16	3079A 16	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30898 01	3079B 21	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	3089A 18	3079F 49	3079K 93 pt 3079K 94 pt 3079K 95 pt 3079K 99 pt	32962 61	32962 61	32964 61 32966 61
									32295 00	32295 00	32291 00 pt
									32296 00	32296 00	32292 00 pt
									32297 00	32297 00	32294 00 pt
									32298 00	32298 00	32291 00 pt 32292 00 pt 32294 00 pt
30896 17	3079A 17	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30898 02	3079B 22	3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 94 pt 3079K 99 pt	32311 00 32312 00	32311 00 32312 00	32317 00	33121 98	33121 98	33121 79 33121 85 33121 98
									3312A 11 3312A 23 3312A 25 3312A 27	3312A 11 3312A 23 3312A 25 3312A 27	3312A 00
30896 18	3079A 18	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30898 03	3079B 23	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 94 pt 3079K 99 pt	32620 15	32620 15	32620 14 32620 52 pt	3312B 61 3312B 63 3312B 65 3312B 67	3312B 61 3312B 63 3312B 65 3312B 67	3312B 00
									33151 22 33151 23	33151 22 33151 23	33151 21
30896 19	3079A 19	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30898 04	3079B 24	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 94 pt 3079K 99 pt	32620 19	32620 19	32620 18 32620 52 pt	33152 01	33152 01	33152 11 pt 33152 13 pt 33152 17 pt 33152 19 pt 34967 11 pt 34967 13 pt 34967 17 pt 34967 19 pt
									32752 11	32752 11	32752 00
									32917 23	32917 23	32917 22 32917 24
30896 21	3079A 20	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt 3079J 65 pt 3079J 66 pt 3079K 99 pt	30898 05	3079B 25	3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt	32917 40	32917 40	32917 26 32917 28 32917 39	33152 03	33152 03	33152 11 pt 33152 13 pt 33152 17 pt 33152 19 pt 34967 11 pt 34967 17 pt
									32927 14	32927 14	32928 15 32928 17
30896 22	3079A 21	3079J 61 pt 3079J 62 pt			3079J 61 pt 3079J 62 pt 3079J 63 pt 3079J 64 pt						

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1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published
33152 03— Con.	33152 03— Con.	33152 11 pt —Con. 34967 19 pt	33157 42— Con.	33157 42— Con.	33157 31 pt —Con. 33157 71 pt	33561 66— Con. 33562 78 33563 91 33569 91	33561 66— Con. 33562 78 33563 91 33569 91	33569 92— Con.	34236 21	34236 21	34233 21
									34236 31	34236 31	34233 31
33152 05	33152 05	33152 11 pt 33152 13 pt 33152 17 pt 33152 19 pt 34967 13 pt 34967 17 pt 34967 19 pt	33157 43	33157 43	33157 31 pt 33157 61 pt 33157 71 pt	33630 00	33611 00	33611 00	34236 41	34236 41	34233 41
			33159 44 33159 45 33159 48	33159 44 33159 45 33159 48	33159 49	33640 11	33620 42	33620 42	34236 81	34236 81	34238 81
						33640 21	33691 51	33691 51	34236 99	34236 99	34233 99
33152 07	33152 07	33152 11 pt 33152 13 pt 33152 17 pt 33152 19 pt 34967 11 pt 34967 13 pt 34967 17 pt 34967 19 pt	33159 99	33159 99	33159 77 33159 98	33640 31	33692 31	33692 31	34292 12 34298 99	34292 12 34298 99	34298 98
			33211 21	33211 21	33211 22 pt 33211 24 pt 33211 27 pt 33211 30 pt	33640 41	33693 71	33693 71	34320 01 34320 03	34320 01 34320 03	34320 04
						33640 51	33693 91	33693 91	34320 05 34320 07	34320 05 34320 07	34320 06
			33211 23	33211 23	33211 22 pt 33211 24 pt 33211 27 pt 33211 30 pt	33650 11	33612 11	33612 11	34320 09 34320 11	34320 09 34320 11	34320 08
33152 09	33152 09	33152 11 pt 33152 13 pt 33152 17 pt 33152 19 pt 34967 11 pt 34967 13 pt 34967 17 pt 34967 19 pt	33211 25	33211 25	33211 33 pt 33211 36 pt 33211 39 pt 33211 42 pt	33650 31	33612 31	33612 31	34320 14 34320 25 34320 35	34320 14 34320 25 34320 35	34320 98
						33650 61	33612 61	33612 61	34320 47 34320 48	34320 47 34320 48	34320 79
						33650 73	33612 73	33612 73			
33152 10	33152 10	33152 11 pt 33152 13 pt 33152 17 pt 33152 19 pt 34967 11 pt 34967 13 pt 34967 17 pt 34967 19 pt	33211 26	33211 26	33211 33 pt 33211 36 pt 33211 39 pt 33211 42 pt	33660 20	33620 20	33620 20	34320 67 34320 69	34320 67 34320 69	34320 65
			33217 31	33217 31	33217 32 pt 33217 34 pt 33217 37 pt 33217 40 pt	33660 21	33620 21	33620 21	34320 71 34320 74 34320 75	34320 71 34320 74 34320 75	34320 98
						33660 22	33620 22	33620 22			
						33660 23	33620 23	33620 23			
33152 12	33152 12	33152 11 pt 33152 13 pt 33152 17 pt 33152 19 pt 34967 11 pt 34967 13 pt 34967 17 pt 34967 19 pt	33217 33	33217 33	33217 32 pt 33217 34 pt 33217 37 pt 33217 40 pt	33660 24	33620 24	33620 24	34320 76 34320 78	34320 76 34320 78	34320 77
						33660 25	33620 25	33620 25	34320 80 34320 82	34320 80 34320 82	34320 55
			33217 35	33217 35	33217 43 pt 33217 46 pt 33217 49 pt 33217 52 pt	33660 31	33620 31	33620 31	34320 84 34320 86	34320 84 34320 86	34320 56
33152 14	33152 14	33152 11 pt 33152 13 pt 33152 17 pt 33152 19 pt 34967 11 pt 34967 13 pt 34967 17 pt 34967 19 pt				33660 41	33620 52	33620 61 pt	34320 87 34320 88	34320 87 34320 88	34320 98 pt
			33217 36	33217 36	33217 43 pt 33217 46 pt 33217 49 pt 33217 52 pt	33660 51	33620 51	33620 51	34320 90 34320 91	34320 90 34320 91	34320 40
						33660 61	33620 61 pt	33620 61 pt	34320 92 34320 93	34320 92 34320 93	34320 42
			33252 11	33252 11	33252 12 33252 13	33690 11	33691 61	33691 61	34320 94 34320 95	34320 94 34320 95	34320 43
33152 16	33152 16	33152 11 pt 33152 13 pt 33152 17 pt 33152 19 pt 34967 11 pt 34967 13 pt 34967 17 pt 34967 19 pt	33391 00	33331 00	33331 00	33690 15	33692 11	33692 11	34320 96 34320 97	34320 96 34320 97	34320 44
			33392 31	33334 31	33334 31	33690 21	33692 33	33692 33	34320 99	34320 99	34320 98 pt
			33392 37	33334 37	33334 35 pt	33690 25	33692 41	33692 41	34432 44	34432 44	34432 45
33152 22	33152 22	33152 33 pt 34967 23 pt	33392 39	33334 39	33334 38 pt	33690 91 33690 98	33693 94 33693 99	33693 99	34432 46 34432 48	34432 46 34432 48	34432 47
33152 23	33152 23	33152 23 34967 19 pt	33392 41	33334 41	33334 41	34234 11	34234 11	34232 31	34432 52 34432 54 34432 56 34432 98	34432 52 34432 54 34432 56 34432 98	34432 99
33152 25	33152 25	33152 25 34967 21	33392 43	33334 43	33334 45 pt	34234 22	34234 22	34232 83	34433 13	34433 13	34433 12 34433 14 34433 48 pt
33152 30	33152 30	33152 33 pt 34967 23 pt	33392 49	33334 49	33334 48 pt	34234 33	34234 33	34232 85	34433 17	34433 17	34433 16 34433 18 34433 48 pt
33152 31	33152 31	33152 33 pt 34967 23 pt	33392 51	33334 51	33334 35 pt 33334 38 pt 33334 45 pt 33334 48 pt	34234 44 34234 98	34234 44 34234 98	34232 99			
33156 15 33156 17	33156 15 33156 17	33156 13	33392 55	33334 55	33334 55	34235 11	34235 11	34232 53			
33156 22 33156 24	33156 22 33156 24	33156 21	33392 01	33321 00	33321 00	34235 12	34235 12	34232 54			
33157 21	33157 21	33157 31 pt 33157 61 pt 33157 71 pt	33392 05	33323 00	33323 00	34235 21	34235 21	34232 56			
			33392 73	33398 73	33399 85	34235 22	34235 22	34232 58			
33157 22	33157 22	33157 31 pt 33157 61 pt 33157 71 pt	33392 99	33398 99	33398 23 33398 98 33399 81	34235 31	34235 31 35533 81	34232 99 pt 35531 85 pt 35532 81 pt			
33157 23	33157 23	33157 31 pt 33157 61 pt 33157 71 pt	33416 99	33416 99	33416 51 33416 98	34235 33	34235 33 35533 83	34232 99 pt 35531 85 pt 35532 81 pt	34433 32	34433 32	34433 31 34433 33 34433 48 pt
			33542 61	33542 61	33542 51 pt 33542 53 pt	34235 39	34235 39 35533 84	34232 99 pt 35531 85 pt 35532 81 pt	34433 38	34433 38	34433 45
33157 41	33157 41	33157 31 pt 33157 61 pt 33157 71 pt	33542 63	33542 63	33542 51 pt 33542 53 pt	34235 39	34235 39 35533 84	34232 99 pt 35531 85 pt 35532 81 pt	34433 39 34433 49 34433 50	34433 39 34433 49 34433 50	34433 48 pt
33157 42	33157 42	33157 31 pt 33157 61 pt	33561 66	33561 66	33569 92	34236 11	34236 11	34233 11	34434 13	34434 13	34434 12 pt
									34434 15	34434 15	34434 18 pt

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1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published
34434 17	34434 17	34434 12 pt	34463 12	34463 12	34460 46	34913 35	3494A 45	3494A 45	34931 57	34931 57	34931 56 34931 58
34434 19	34434 19	34434 18 pt	34463 20 34463 22	34463 20 34463 22	34460 49	34913 47	3494A 46	3494A 46	34931 99	34931 99	34931 63 34931 98
34435 21 34435 23	34435 21 34435 23	34435 20	34464 10	34464 10	34460 54 pt 34460 56 pt	34913 59	3494A 47	3494A 47	34932 10 34932 20	34932 10 34932 20	34932 00
34435 31 34435 33	34435 31 34435 33	34435 35	34464 13	34464 13	34460 54 pt 34460 56 pt	34914 11	3494A 51	3494A 51	34944 21	34944 21	34944 11
34435 37 34435 39	34435 37 34435 39	34435 38	34464 16	34464 16	34460 54 pt 34460 56 pt	34914 13	3494A 52	3494A 52	34944 31 34944 41 34944 51 34944 99	34944 31 34944 41 34944 51 34944 99	34944 19
34438 03 34438 05	34438 03 34438 05	34438 04	34464 18	34464 18	34460 54 pt 34460 56 pt	34914 15	3494A 53	3494A 53	34945 12 34945 14 34945 16 34945 17 34945 99	34945 12 34945 14 34945 16 34945 17 34945 99	34945 98
34438 14 34438 16	34438 14 34438 16	34438 15	34465 10	34465 10	34460 54 pt	34914 17	3494A 54	3494A 54	34961 22 34961 31	34961 22 34961 31	34961 21
34438 17 34438 19	34438 17 34438 19	34438 18	34465 12	34465 12	34460 56 pt	34914 21	3494A 55	3494A 55	34964 41	34964 41	34964 31 pt 34964 61 pt 34964 71 pt 34964 99 pt
34439 15 34439 17 34439 19	34439 15 34439 17 34439 19	34439 21	34465 30	34465 30	34460 62	34914 23	3494A 56	3494A 56	34964 43	34964 43	34964 31 pt 34964 61 pt 34964 71 pt 34964 99 pt
34439 31 34439 32 34439 33 34439 34	34439 31 34439 32 34439 33 34439 34	34439 30	34482 11	34482 11	34482 17 34482 27	34914 25	3494A 57	3494A 57	34964 45	34964 45	34964 31 pt 34964 61 pt 34964 71 pt 34964 99 pt
34439 51 34439 53	34439 51 34439 53	34439 56	34625 11 34625 13 34625 15 34625 17	34625 11 34625 13 34625 15 34625 17	34625 00	34914 31	3494A 58	3494A 58	34964 51	34964 51	34964 31 pt 34964 61 pt 34964 71 pt 34964 99 pt
34441 21	34441 21	34446 37	34626 11 34626 13 34626 15 34626 17	34626 11 34626 13 34626 15 34626 17	34626 00	34914 61	3494A 59	3494A 59	34966 23 34966 25	34966 23 34966 25	34966 13
34441 23	34441 23	34446 36	34627 11 34627 13 34627 15 34627 17	34627 11 34627 13 34627 15 34627 17	34627 00	34915 11	3494A 61	3494A 61	34966 27 34966 29	34966 27 34966 29	34966 21
34441 27	34441 27	34446 34	34628 11 34628 13 34628 15 34628 17	34628 11 34628 13 34628 15 34628 17	34628 00	34915 23	3494A 63	3494A 63	34968 45 34968 46 34968 47	34968 45 34968 46 34968 47	34968 49
34441 29	34441 29	34446 32	34692 20 34692 88 34692 98	34692 20 34692 88 34692 98	34692 99	34915 35	3494A 65	3494A 65	34968 81 34968 83 34968 85	34968 81 34968 83 34968 85	34968 98
34443 11 34443 13	34443 11 34443 13	34446 21	34696 00 34699 98	34696 00 34699 98	34699 99	34915 47	3494A 67	3494A 67	34992 13	34992 13	34992 12 34992 19
34443 21 34443 23	34443 21 34443 23	34446 25	34790 10 34790 11 34790 21	34790 10 34790 11 34790 21	34790 19	34915 61	3494A 69	3494A 69	34995 21	34995 21	34995 13 34995 15
34447 21	34447 21	34446 47	34790 73 34790 75	34790 73 34790 75	34790 71	34916 11	3494A 31	3494A 31	34995 31 34995 39	34995 31 34995 39	34995 19
34447 25	34447 25	34446 46	34911 11	3494A 11	3494A 11	34916 23	3494A 32	3494A 32	34998 25 34998 99	34998 25 34998 99	34998 98
34447 31	34447 31	34446 11	34911 21	3494A 12	3494A 12	34916 31	3494A 33	3494A 33	35111 01 35111 02	35111 01 35111 02	35111 00
34447 41	34447 41	34446 51	34911 23	3494A 13	3494A 13	34916 33	3494A 34	3494A 34	35112 00	35112 00	35112 00 pt
34448 11	34448 11	34446 62 pt	34911 34	3494A 14	3494A 14	34916 41	3494A 35	3494A 35	35112 21	35112 21	35112 01 pt 35112 15 35112 16
34448 13 34448 19	34448 13 34448 19	34446 64 pt	34911 38	3494A 15	3494A 15	34916 43	3494A 36	3494A 36	35112 22	35112 22	35112 01 pt 35112 17
34449 31	34449 31	34446 15	34911 43	3494A 17	3494A 17	34916 53	3494A 38	3494A 38	35112 23	35112 23	35112 08 35112 18
34449 41	34449 41	34446 62 pt 34446 64 pt	34911 52	3494A 19	3494A 19	34916 77	3494A 71	3494A 71	35112 24	35112 24	35112 09 35112 19
34449 53	34449 53	34446 44	34912 01	3494A 21	3494A 21	34916 79	3494A 75	3494A 75			
34449 55	34449 55	34446 42	34912 11	3494A 22	3494A 22	34916 98	3494A 98	3494A 98			
34449 62	34449 62	34446 62 pt	34912 21	3494A 23	3494A 23	34917 11	34949 11	34949 11			
34449 65	34449 65	34446 64 pt	34912 23	3494A 24	3494A 24	34917 13	34949 13	34949 13			
34449 98	34449 98	34446 98	34912 31	3494A 25	3494A 25	34917 15	34949 15	34949 15			
34461 10	34461 10	34460 07	34912 35	3494A 26	3494A 26	34917 27	34949 27	34949 21 34949 23 34949 25			
34461 12	34461 12	34460 09	34912 41	3494A 27	3494A 27	34917 31	34949 31	34949 31			
34461 15	34461 15	34460 12	34912 43	3494A 29	3494A 29	34917 39	34949 39	34949 39			
34461 17	34461 17	34460 17	34913 11	3494A 39	3494A 39	34917 98	34949 98	34949 98			
34462 10	34462 10	34460 31	34913 23	3494A 43	3494A 43	34918 00	34947 00	34947 00			
34462 12	34462 12	34460 36				34919 00	34948 00	34948 00			
34462 22	34462 22	34460 22				34921 00	3494B 00	3494B 00			
34462 26	34462 26	34460 51				34922 00	3494C 00	3494C 00			
34463 10	34463 10	34460 41				34923 00	3494D 00	3494D 00			
						34924 00	3494E 00	3494E 00			
						34925 00	3494F 00	3494F 00			
						34926 00	3494G 00	3494G 00			
						34927 00	3494H 00	3494H 00			

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35112 74	35112 74	35112 75 pt	3531E 00	3531E 00	35314 00 pt	35337 22 35337 23	35337 22 35337 23	35331 41	35364 03	35364 03	35362 09 35362 15 pt
35112 76	35112 76	35112 75 pt 35112 77	3531F 00	3531F 00	35316 00	35337 24 35337 25	35337 24 35337 25	35331 46	35364 04	35364 04	35362 11 35362 15 pt
35112 79 35112 83	35112 79 35112 83	35112 00 pt	3531G 00	3531G 00	35318 00 pt	35337 26 35337 27	35337 26 35337 27	35331 43	35364 05	35364 05	35362 13 35362 15 pt
35199 01	35199 01	35199 98 pt	3531H 00	3531H 00	35313 00 pt 35318 00 pt 35319 85	35337 44	35337 44	35331 44	35364 06	35364 06	35362 14 35362 15 pt
35199 33	35199 26	35199 26	3531K 06	3531K 06	35319 06	35337 45	35337 45	35331 45	35364 17	35364 17	35362 55 pt
35199 41 35199 42	35199 41 35199 42	35199 03	3531K 07	3531K 07	35319 07	35337 47	35337 47	35331 47	35364 52	35364 52	35362 52
35199 43 35199 44	35199 43 35199 44	35199 04	3531K 11	3531K 11	35319 11	35337 48	35337 48	35331 48	35364 54	35364 54	35362 55 pt
35199 45 35199 46	35199 45 35199 46	35199 05	3531K 20	3531K 20	35319 20	35337 59	35337 59	35331 59	35373 01 35373 02	35373 01 35373 02	35371 23 pt
35199 47	35199 47	35199 06 pt 35199 07 pt	3531K 21	3531K 21	35319 21	35337 61	35337 61	35332 61 pt	35373 03	35373 03	35371 11 pt
35199 48	35199 48	35199 06 pt 35199 07 pt	3531K 22 3531K 24	3531K 22 3531K 24	35319 23	35338 31	35338 31	35332 31	35373 05	35373 05	35371 36 pt 35371 37 pt 35371 38 pt
35199 51 35199 52	35199 51 35199 52	35199 14	3531K 25	3531K 25	35319 25	35338 51	35338 51	35332 51	35373 06	35373 06	35371 36 pt 35371 37 pt 35371 38 pt
35199 53 35199 54	35199 53 35199 54	35199 15	3531K 27	3531K 27	35319 27	35338 55	35338 55	35332 55	35373 08	35373 08	35371 11 pt
35199 55 35199 56	35199 55 35199 56	35199 16	3531K 53 3531K 55	3531K 53 3531K 55	35319 52	35338 98	35338 98	35332 98	35373 12	35373 12	35371 61
35199 57 35199 58	35199 57 35199 58	35199 17	3531K 61	35363 36	35361 36	35338 99	35338 99	35332 61 pt	35373 15	35373 15	35371 23 pt 35371 41 pt
35199 59 35199 60	35199 59 35199 60	35199 18	3531K 70	3531K 70	35319 70	35339 12	35339 12	35333 12	35373 16	35373 16	35371 11 pt
35199 61 35199 62	35199 61 35199 62	35199 19	3531K 74	3531K 74	35319 72 35319 73	35339 13	35339 13	35333 13	35373 17	35373 17	35371 36 pt 35371 37 pt 35371 38 pt 35371 41 pt
35199 91	35199 91	35199 22 pt 35199 23 pt 35199 28 pt 35199 29 pt 35199 98 pt	3531K 77	3531K 77	35319 75 35319 76	35339 53	35339 53	35333 53	35373 18	35373 18	35371 11 pt
35199 92	35199 92	35199 22 pt 35199 23 pt 35199 28 pt 35199 29 pt 35199 98 pt	3531K 82	3531K 82	35319 82	35339 55	35339 55	35333 55	35373 19	35373 19	35371 65
35239 26	35239 26	35239 21 35239 25	3531K 90	3531K 40 35373 90	35319 41 35371 91 35371 93	35339 61	35339 61	35333 61	35373 21	35373 21	35371 55
35239 31	35239 31	35239 01 35239 02 35239 03 35239 04 35239 05 35239 06 35239 07 35239 08 35239 09 35239 11 35239 12 35239 19 35239 30	3531K 97	3531K 97	35319 97	35339 65	35339 65	35333 65	35373 25	35373 25	35371 99 pt
35239 53	35239 53	35239 50 35239 51	3531M 01	3531M 01	35313 00 pt	35339 71	35339 71	35333 71	35373 26	35373 26	35371 75
3523C 00	3523C 00	35234 00 pt 35237 00 35238 00 pt	3531M 03	3531M 03	35314 00 pt	35339 82	35339 82	35333 82	35373 28	35373 28	35371 81
3523E 00	3523E 00	35234 00 pt 35238 00 pt	3531M 05	3531M 05	35319 84 pt 35319 86 pt	35339 88	35339 88	35333 88	35373 29	35373 29	35371 83
3523F 00	3523F 00	3523A 00 3523B 00	3531M 07	3531M 07	35319 84 pt 35319 86 pt	35339 98	35339 98	35333 98	35373 31	35373 31	35371 71
35246 00	35246 00	35243 00 35245 00	3531M 09	3531M 09	35319 84 pt 35319 86 pt	3533A 10	3533A 10	35335 10	35373 32	35373 32	35371 85
3531A 00	3531A 00	35311 00	3531M 15	3531M 19	35319 84 pt 35319 86 pt 35372 85 pt	3533A 78	3533A 78	35335 78	35373 35	35364 41	35362 41
3531B 00	3531B 00	35312 00	35329 33	35329 33	35329 31 pt 35329 35 pt	3533B 21	3533B 21	35336 21	35373 39	35373 39	35371 48 35371 99 pt
3531C 00	3531C 00	35317 10 35317 20 35317 30	35329 34	35329 34	35329 31 pt 35329 35 pt	3533B 32 3533B 34	3533B 32 3533B 34	35336 31	35374 11	35374 11	35372 11
			35329 37 35329 38 35329 41 35329 43	35329 37 35329 38 35329 41 35329 43	35329 71 35329 73 35329 75	35363 01 35363 02 35363 03	35363 01 35363 02 35363 03	35361 11	35374 17	35364 57	35362 57
			35337 11	35337 11	35331 11	35363 13	35363 13	35361 13	35374 19	35374 19	35372 85 pt
			35337 12	35337 12	35331 12	35363 15	35363 15	35361 14	35419 21 35419 22 35419 23 35419 24 35419 25 35419 26	35419 21 35419 22 35419 23 35419 24 35419 25 35419 26	35419 41
			35337 14	35337 14	35331 14	35363 32	35363 32	35361 33 35361 39 pt	3541D 00	3541D 00	35411 00 35412 00
			35337 15	35337 15	35331 15	35363 34	35363 34	35361 35 35361 39 pt	35421 00	35421 00	35421 10 35421 20
			35337 16	35337 16	35331 16	35363 37 35363 38	35363 37 35363 38	35361 39 pt	35424 01 35424 02	35424 01 35424 02	35424 11
			35337 17	35337 17	35331 17	35363 45	35363 45	35361 45	35424 03 35424 04 35424 05	35424 03 35424 04 35424 05	35424 75
			35337 21	35337 21	35331 21	35364 01	35364 01	35362 07 35362 15 pt	35430 11	35650 11	35650 11
						35364 02	35364 02	35362 08 35362 15 pt			

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35430 98	35650 98	35650 98	35462 72	35462 72	35462 73 35462 74 35462 75 35462 76 35462 77 35462 78	35484 09	35496 19	35496 19	35543 03	35543 03	35541 28 pt 35542 73 pt
35441 23 35441 25	35441 23 35441 25	35441 29				35485 01	35497 61	35497 61	35543 04	35543 04	35541 25 35542 73 pt
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35451 53	35451 53	35451 43 35451 44	35481 05	36231 33	36231 33	35521 38	35521 38	35521 42 35521 47	35543 21	35543 21	35541 59 pt 35542 73 pt
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35454 37	35454 37	35453 37	35481 12	36231 57	36231 57	35533 11	35533 11	35531 11	35543 27	35543 27	35541 57 pt 35542 73 pt
35454 38	35454 38	35453 38	35481 19	36231 59	36231 59	35533 13	35533 13	35531 13	35544 01	35544 01	35542 89
35454 41	35454 41	35453 41	35482 01 35482 02	36232 01 36232 02	36232 41	35533 15	35533 15	35531 15	35544 02	35544 02	35542 83
35454 43	35454 43	35453 43	35482 03	36232 11	36232 11	35533 19	35533 19	35531 62	35544 03 35544 04	35544 03 35544 04	35542 85
35454 45	35454 45	35453 45	35482 04	36232 23	36232 23	35533 21 35533 23	35533 21 35533 23	35531 73 pt	35544 05	35544 05	35542 87
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35455 13	35455 13	35452 13	35482 11	36232 52	36232 52	35533 39	35533 39	35531 17 35531 73 pt 35531 75 pt 35531 98 pt	35558 02 35558 09	35558 02 35558 09	35557 01
35455 15	35455 15	35452 15	35482 12	36232 54	36232 54	35534 01 35534 02 35534 03	35534 01 35534 02 35534 03	35532 21	35558 69	35558 69	35557 69
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35455 21	35455 21	35452 21	35482 14	36232 58	36232 58	35534 11	35534 11	35532 81 pt	35558 85	35558 85	35557 85
35455 61	35455 61	35452 61	35482 15	36232 62	36232 61 36232 65	35543 01	35543 01	35541 11 35542 73 pt	35558 87	35558 87	35557 87
35455 65	35455 65	35452 65	35482 16	36232 66	36232 64 pt 36232 68 pt	35543 02	35543 02	35541 21 35541 27 35542 73 pt	35558 89	35558 89	35557 89
35455 71	35455 71	35452 71	35483 05	36233 13	36233 13	35543 03	35543 03	35541 21 35541 27 35542 73 pt	35558 99	35558 99	35557 99
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35455 91 35455 92	35455 91 35455 92	35452 92	35483 07	36233 31	36233 31	35543 05	35543 05	35541 21 35541 27 35542 73 pt	35561 05	35561 05	35561 73
35455 93	35455 93	35452 99 pt	35483 08	36233 52	36233 52	35543 06	35543 06	35541 21 35541 27 35542 73 pt	35561 06	35561 06	35561 83
35455 94	35455 94	35452 94	35483 09	36233 61	36233 61						
35455 95	35455 95	35452 95	35483 11	36233 71	36233 71						
35455 96 35455 97 35455 98	35455 96 35455 97 35455 98	35452 99 pt	35483 19	36233 81	36233 81						
			35484 01	35496 01	35496 01						
			35484 02	35496 05	35496 05						
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			35484 04	35496 15	35496 15						
			35484 05	35496 17	35496 17						

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1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published
35561 07	35511 07	35511 91	35593 01	35593 11	35593 11	35599 13	35599 13	35595 41 pt 35595 98 pt	35616 00	35616 00	3561C 00
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35561 09	35511 09	35511 41 pt	35593 05	35593 32	35593 32						
35561 11 35561 19 35561 21	35511 11 35511 19 35511 21	35511 99 pt	35593 07	35593 34	35593 34	35599 17	35599 17	35595 41 pt 35595 98 pt	35646 10 35646 20	35646 10 35646 20	35646 00
35562 11	35512 11	35512 11	35593 11	35593 52	35593 52	35599 19	35599 19	35595 41 pt 35595 98 pt	35651 01	35514 15 35691 15	35514 15 35691 15
35562 21	35512 21	35512 21	35593 13	35593 13	35593 53 35593 54	35599 22	35599 22	35595 41 pt 35595 98 pt	35651 02	35514 22 35691 22	35514 22 35691 22
35562 31	35512 31	35512 31	35593 15	35593 61	35593 61	35599 25	35599 25	35595 41 pt 35595 98 pt	35651 03	35514 26 35691 26	35514 26 35691 26
35562 41	35512 41	35512 41									
35562 51	35512 51	35512 51	35593 17	35593 71	35593 71	35599 27	35599 27	35595 41 pt	35651 04	35514 29 35691 29	35514 29 35691 29
35562 65	35512 65	35512 61 35512 92 pt	35593 19	35593 72	35593 72	35599 29	35599 29	35595 41 pt	35651 05	35514 30 35691 30	35514 30 35691 30
35562 71	35512 71	35512 71	35593 21 35593 23 35593 25	35593 21 35593 23 35593 25	35593 79	35599 31 35599 33	35599 31 35599 33	35595 45			
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35562 85	35512 85	35512 92 pt	35594 01	35594 11	35594 11	35599 39 35599 41	35599 39 35599 41	35595 43	35651 07	35514 33 35691 33	35514 33 35691 33
35562 91	35512 91	35512 87 35512 92 pt				35599 43 35599 45	35599 43 35599 45	35595 52	35651 08	35514 35 35691 35	35514 35 35691 35
35563 01	35513 01	35513 59 pt	35594 03	35594 31	35594 31	35599 47	35599 47	35595 85 pt	35651 09	35514 41 35691 41	35514 41 35691 41
35563 02	35513 02	35513 39	35594 05	35594 51	35594 51						
35563 03 35563 04	35513 03 35513 04	35513 59 pt	35594 07	35594 71	35594 71	35599 49 35599 51	35599 49 35599 51	35595 98 pt	35651 11	35514 52 35691 52	35514 52 35691 52
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35563 09	35513 09	35513 59 pt	35596 13 35596 15	35596 13 35596 15							
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35592 07	35592 54	35592 54	35596 49 35596 51	35596 49 35596 51							
35592 09 35592 11	35592 09 35592 11	35592 98 pt	35597 01 35597 02 35597 03	35494 01 35494 03 35494 05	35494 01 35494 03 35494 05	35599 85	35599 85	35595 62 pt 35595 98 pt	35674 01	35674 01	35674 11 pt
35592 15	35592 15	35592 41 35592 42 35592 98 pt	35597 04	35494 07	35494 07	35599 86 35599 87	35599 86 35599 87	35595 98 pt	35674 02	35674 02	35674 17
35592 19	35592 97	35592 97	35597 05	35494 09	35494 09	35599 88	36362 74	36362 74	35674 03	35674 03	35674 19 pt 35674 31 pt
			35597 09	35494 11	35494 17 35494 19 pt	35599 89	36362 75	36362 75	35674 04	35674 04	35674 11 pt 35674 19 pt 35674 31 pt
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			35599 05 35599 07	35599 05 35599 07	35595 21	35599 99	35599 99	35595 88 35595 98 pt	35675 11 35675 12	35675 11 35675 12	35675 91
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						35676 01	35676 01				35672 11

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1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published
35676 02	35676 02	35672 21	35751 00	35732 40 36612 10	35732 00 pt 36612 00 pt	35892 98	35892 98	35892 89 pt	35963 03	35763 03	35760 62
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35676 04	35676 04	35672 00 pt	35771 00	35732 30 35732 61	35732 00 pt	35893 01 35893 02	35893 01 35893 02	35893 11	35963 09	35763 09	35760 84
35676 05	35676 05	35672 41 pt		35772 00	35733 30	35734 30 pt 35735 51 pt	35893 08 35893 09	35893 08 35893 09	35893 98	36122 02 36122 04 36122 06	36122 02 36122 04 36122 06
35676 06	35676 06	35672 00 pt	35781 00	35733 60	35734 30 pt 35735 51 pt 35734 30 pt 35735 51 pt	35921 01	35921 01	35921 11	36122 14 36122 16 36122 19 36122 21 36122 23 36122 28 36122 29	36122 14 36122 16 36122 19 36122 21 36122 23 36122 28 36122 29	
35676 17 35676 19	35676 17 35676 19	35672 41 pt		35782 00	35743 00	35743 00	35921 02	35921 02	35921 13		
35681 11 35681 13	35681 11 35681 13	35681 15	35783 00	35743 00	35743 00	35921 03	35921 03	35921 71			
35683 36 35683 93 35683 95	35683 36 35683 93 35683 95	35683 99 pt		35788 00	35744 00	35744 00	35921 05	35921 05	35921 72		
35683 98	35683 98	35683 91 35683 99 pt	3579A 00	35745 00	35745 10 35745 31	35922 01	35922 01	35922 21	36122 32 36122 33 36122 37 36122 39 36122 41 36122 42 36122 43 36122 44	36122 32 36122 33 36122 37 36122 39 36122 41 36122 42 36122 43 36122 44	
35692 00	35692 00	35694 00 35695 00 35696 00		3579A 00	3579A 00	3579A 20 3579A 40 3579A 41 3579A 44 3579A 50 3579A 55	35922 02	35922 02	35922 23		
35693 04	35693 04	35693 01 pt 35693 02 pt 35693 03 pt	35820 35 35820 36	35820 35 35820 36	35820 24	35922 03	35922 03	35922 51			
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35693 05	35693 05	35693 01 pt 35693 02 pt 35693 03 pt	35856 00	35856 00	35856 11 35856 30	35922 05	35922 05	35922 55			
35693 06	35693 06	35693 01 pt 35693 02 pt 35693 03 pt	35859 05 35859 07	35859 05 35859 07	35859 09	35922 06	35922 06	35922 57			
			3585C 00	3585A 10 3585A 20 36993 00	3585A 10 3585A 20 36993 00	35922 09	35922 09	35922 59			
35697 00	35697 00	35699 97 pt	3585D 10	3585B 10	3585B 10	35923 01	35923 01	35923 61	36126 01 36126 02 36126 03 36126 04 36126 05 36126 09	36126 01 36126 02 36126 03 36126 04 36126 05 36126 09	36125 00 pt
35698 01 35698 02	35698 01 35698 02	35699 31	3585D 20	3585B 20	3585B 20	35923 02	35923 02	35923 63			
35698 03 35698 04	35698 03 35698 04	35699 32	3585D 30	3585B 30	3585B 30	35931 00	35991 00	35996 00 35997 00			
35698 05 35698 06	35698 05 35698 06	35699 33	3585D 40	3585B 40	3585B 40	35932 00	35998 00	35998 00	36127 11 36127 31 36127 78	36127 11 36127 31 36127 78	36127 00
35698 07 35698 08	35698 07 35698 08	35699 35	3585D 50	3585B 50	3585B 50	35933 00	35999 00	35999 00			
35698 11 35698 12	35698 11 35698 12	35699 36	3585D 60	3585B 60	3585B 60	35941 10	35619 00	35617 00 35618 00	36249 94 36249 96	36249 94 36249 96	36249 98
35698 13 35698 14	35698 13 35698 14	35699 41	3585D 70	3585B 70	3585B 70	35941 20	35631 50	35631 40 pt			
35698 15 35698 16	35698 15 35698 16	35699 43	3585D 80	3585B 72 36994 07	3585B 72 36994 07	35942 10	3561D 00	3561A 00 3561B 00	36251 00	36138 10 36794 00	36138 00 pt 36794 00
35698 17 35698 18	35698 17 35698 18	35699 45	35860 89	35860 89	35860 21 35860 41 35860 88	35942 20	35631 60	35631 40 pt	36252 00	36221 00	36221 00
35698 21 35698 22	35698 21 35698 22	35699 51	35892 03	35892 03	35892 01 pt	35942 30	35631 70	35631 50 pt	36253 00	36222 00	36222 00
35698 23 35698 24	35698 23 35698 24	35699 61	35892 04	35892 04	35892 02 pt	35942 40	35631 80	35631 60 pt	36254 00	36138 20 36223 00	36138 00 pt 36223 00
35698 25 35698 26	35698 25 35698 26	35699 71	35892 05	35892 05		35942 50	35631 90	35631 70 pt	36291 01	36291 11	36291 11
35698 27 35698 28	35698 27 35698 28	35699 73	35892 06	35892 06	35892 01 pt 35892 02 pt	35942 60	35631 00	35631 80 pt	36291 03	36291 31	36291 31
35698 31 35698 32	35698 31 35698 32	35699 74	35892 07	35892 07	35892 03 pt	35942 70	35631 10	35631 90 pt	36291 05	36291 05	36291 35 36291 98 pt
35698 35 35698 36 35698 48 35698 49	35698 35 35698 36 35698 48 35698 49	35699 97 pt	35892 08	35892 08	35892 04 pt	35942 80	35631 20	35631 00 pt	36291 09	36291 09	36291 98 pt
35711 00	35731 00 36629 43	35731 00 36629 00 pt	35892 09	35892 09	35892 05 pt	35942 90	35631 30	35631 10 pt	36293 01	36293 01	36293 13 36293 15
35712 00	35733 05	35734 20 35735 41	35892 10	35892 10	35892 06 pt	35943 00	35631 40	35631 20 pt	36293 02	36293 31	36293 31
35721 00	35732 10	35732 00 pt	35892 11	35892 11	35892 07 pt	35943 10	35631 50	35631 30 pt	36293 03 36293 04 36293 05 36293 09	36293 03 36293 04 36293 05 36293 09	36293 99
35722 00	35733 10	35734 30 pt 35735 51 pt	35892 12	35892 12	35892 08 pt	35943 20	35631 60	35631 40 pt	36311 10 36311 20	36311 10 36311 20	36311 00
			35892 13	35892 13	35892 09 pt	35943 30	35631 70	35631 50 pt	36313 10 36313 20	36313 10 36313 20	36313 00
			35892 14	35892 14	35892 10 pt	35943 40	35631 80	35631 60 pt	36314 10 36314 20	36314 10 36314 20	36314 00
			35892 15	35892 15	35892 11 pt	35943 50	35631 90	35631 70 pt	36330 10	36330 10	36331 00 36333 11 36333 15 36333 71
			35892 16	35892 16	35892 12 pt	35943 60	35632 00	35631 80 pt	36330 20	36330 20	36333 95
			35892 17	35892 17	35892 13 pt	35943 70	35632 10	35631 90 pt	36349 20	36349 20	36349 13 36349 18 36349 88 36349 89

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36395 10	36361 21 36395 30	36361 21 36394 00 pt 36399 60	36920 05— Con.	36920 05— Con.	36920 10 pt —Con. 36920 82 pt 36920 92 pt	37112 02— Con.	37112 02— Con.	37112 23 pt —Con. 37112 26 pt	37131 07	37131 07	37131 60 pt
									37131 11	37131 40	37131 40
36395 20	36361 84 36395 40	36361 84 36394 00 pt 36399 91 36399 93	36920 07	36920 07	36920 10 pt 36920 70 pt 36920 82 pt 36920 92 pt	37112 03	37112 03	37112 11 pt 37112 13 pt	37131 13	37131 13	37131 42 37131 46
						37112 04	37112 04	37112 11 pt 37112 13 pt 37112 15 pt	37131 15	37131 48	37131 48
36411 00	36410 10	36410 20 36410 55 36410 63	36920 09	36920 09	36920 95	37112 05	37112 05	37112 11 pt 37112 13 pt	37131 16	37131 50	37131 50
			36941 01	36941 01	36941 11				37131 17	37131 52	37131 52
36412 00	36994 22	36994 11 36994 21	36941 02	36941 02	36941 16	37112 06	37112 06	37112 11 pt 37112 13 pt 37112 15 pt 37112 17 pt 37112 21 pt 37112 23 pt 37112 25 pt 37112 26 pt	37131 21	37131 37	37131 37
36489 12	36489 12	36489 11 pt 36489 19 pt	36941 03	36941 03	36941 31				37131 43	37131 30	37131 30
			36941 04	36941 04	36941 35				37131 49	37131 49	37131 12 pt 37131 25
36489 16	36489 16	36489 11 pt	36942 01	36942 01	36942 14 36942 28 pt				37131 53	37131 33	37131 33
36489 17	36489 17	36489 19 pt				37112 07	37112 07	37112 11 pt 37112 13 pt 37112 15 pt	37131 55	37131 34	37131 34
36520 00	36520 00	36521 00 36521 19	36942 02	36942 02	36942 28 pt				37131 57	37131 54	37131 54
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36520 01	36520 01	36521 01 pt 36521 02 pt							37131 62	37131 38	37131 38
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									37132 17	37132 17	
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36920 05	36920 05	36920 10 pt 36920 70 pt	37112 02	37112 02	37112 23 pt 37112 25 pt						

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1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published	
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3714A 04	3714A 04	37143 26	37322 25	37322 25	37322 48	37433 12 37433 13 37433 14 37433 15	37433 12 37433 13 37433 14 37433 15	37433 79	38210 20	38113 20	38113 00 pt	
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3714A 06	3714A 06											
3714A 07	3714A 07	37143 44	37322 29	37322 29	37322 53 37322 55 pt 37322 61	37511 01	37511 11	37511 11	38260 00	38326 00		38326 00
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37313 21	37313 21	37313 98 pt							38421 07	38421 38	38421 38	
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37322 01	37322 01	37322 03 37322 04 37322 06 37322 08				37950 01	37950 01	37950 11 37950 15	38421 09	38421 81	38421 81	
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37322 09	37322 09	37322 15				37996 04	37996 36	37996 36	38421 13	38421 13	38421 99 pt	
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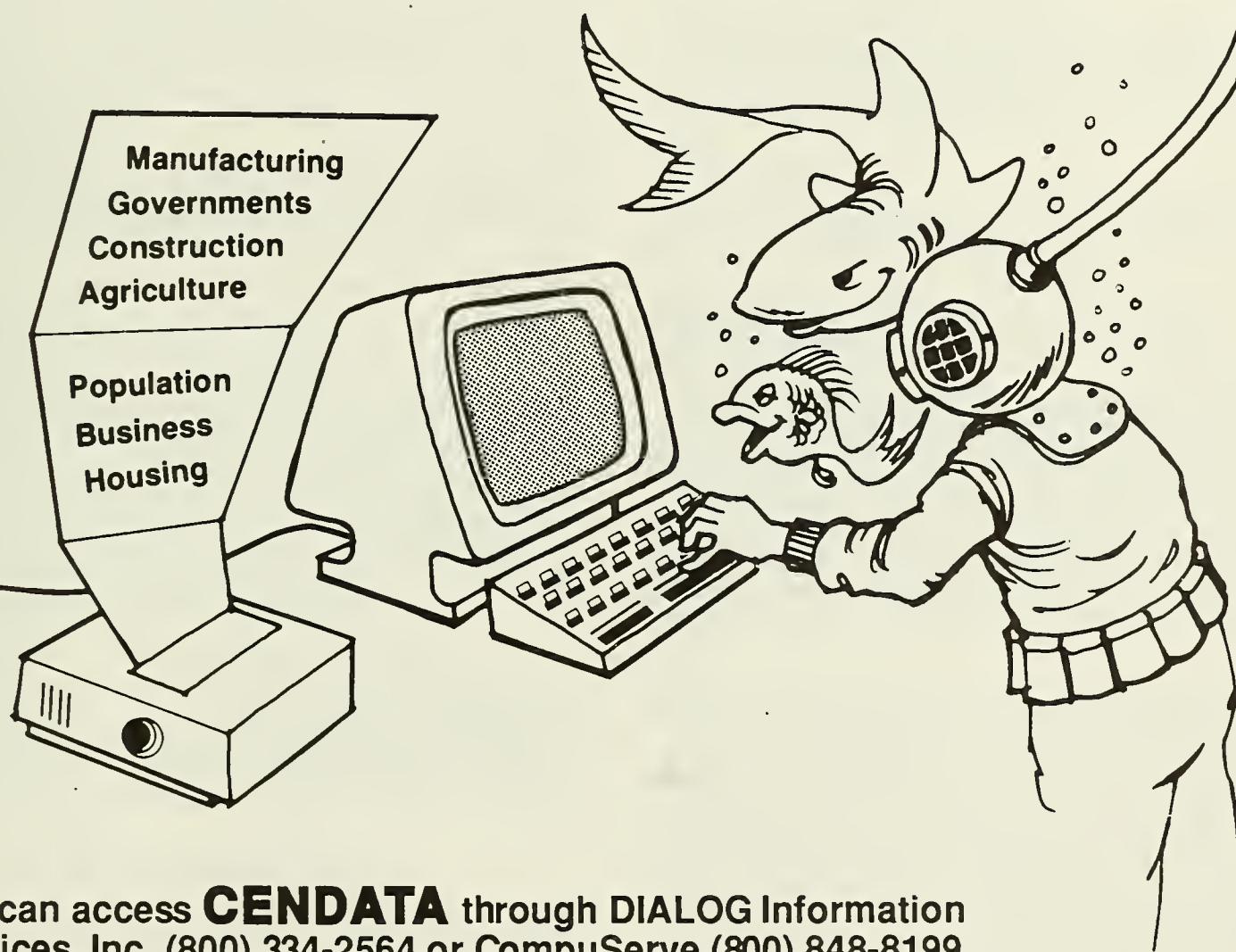
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38517 04— Con. 38517 06 38517 07 38517 10 38517 11	38517 04— Con. 38517 06 38517 07 38517 10 38517 11	38517 09— Con.	38731 06	38731 06	38737 01	39153 11	39153 11	39151 13 pt	39610 65— Con. 39610 71	39610 65— Con. 39610 71	39610 72— Con.
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38611 11	38611 11	38611 12 38611 14	38731 13	38731 13	38736 39	39154 00	39154 11	39151 13 pt 39151 31 pt 39151 51 pt	39651 01	39630 11	39630 11
38611 69	38611 69	38611 67 38611 68							38732 01	38732 01	38732 10 38732 22
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			38732 03	38732 03	38732 16 38732 26	39443 47 39443 98	39443 47 39443 98	39443 99	39651 21	39630 61	39630 61
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38613 89	38613 89	38613 98				39447 16	36629 46	36629 00 pt	39654 22	39641 22	39641 22
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38615 04	38615 04	38615 75				39495 98	39495 98	39495 99 pt	39656 51	39642 51	39642 51
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38615 05	38615 05	38615 57 38615 64 38615 65 38615 76 38615 81	39114 31	39114 31	39112 31 pt	39496 01	39496 01	39494 65	39656 81	39642 81	39642 81
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38731 05	38731 05	38736 31 38736 32 38736 33	39142 69	39142 69	39142 61 pt	39524 19	39524 19	39522 19	39998 17	39620 17	39620 17
			39142 69	39142 69	39142 61 pt	39610 65	39610 65	39610 72	39998 21	39620 21	39620 21

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PUBLICATION PROGRAM

1987 CENSUS OF MANUFACTURES

Publications of the 1987 Census of Manufactures, containing preliminary and final data on manufacturing establishments in the United States, are described below. Publications order forms for the specific reports may be obtained from any Department of Commerce district office or from Data User Services Division, Customer Services (Publications), Bureau of the Census, Washington, DC 20233.

Preliminary Reports

Industry series—83 reports (MC87-I-20A(P) to -39D(P))

Preliminary industry data are issued in 83 separate reports covering 459 industries. Preliminary summary data for the U.S. and States are released in one report.

Final Reports

Industry series—83 reports (MC87-1-20A to -39D)

Each of the 83 reports provides information for a group of related industries ("dairy products" includes industries for butter, cheese, milk, etc.). Final figures for the United States are shown for each of the 459 manufacturing industries on quantity and value of products shipped and materials consumed, cost of fuels and electric energy, capital expenditures, assets, rents, inventories, employment, payroll, payroll supplements, hours worked, value added by manufacture, number of establishments, and number of companies. Comparative statistics for earlier years are provided where available.

For each industry, data on value of shipments, value added by manufacture, capital expenditures, employment, and payroll are shown by employment-size class of establishment, State, and degree of primary product specialization.

Geographic area series—51 reports (MC87-A-1 to -51)

A separate report is being published for each State and the District of Columbia. Each report presents data for industry groups and industries on value of shipments, cost of materials, value added by manufacture, employment, payroll, hours worked, new capital expenditures, and number of manufacturing establishments for the State, MSA's, counties, and selected places. Comparative statistics for earlier census years are shown for the State and large MSA's. Manufacturing totals are presented for each county and for places with significant manufacturing activity. Detailed statistics (including inventories, assets, rents, and energy costs) are presented only in statewide totals.

Subject series—7 reports (MC87-S-1 to -7)

Each of the seven reports contains detailed statistics for an individual subject, such as concentration ratios in manufacturing, type of organization, water use in manufacturing, textile machinery in place, distribution of sales by class of customer, manufacturers' shipments to the Federal Government, and a general national-level summary.

Reference series—1 report (MC87-R-1)

The Numerical List of Manufactured and Mineral Products includes a description of the principal products and services published in the 1987 Censuses of Manufactures and Mineral Industries.

Location of Manufacturing Plants—1 report (MC87-LM)

This report includes data for number of establishments by four-digit SIC industry and by employment-size class for counties, incorporated places of 2,500 inhabitants or more, and zip codes for each State. (This report is available only on magnetic tape and CD-ROM.)

Analytical Reports—3 reports (AR87-1 to -3)

Exports From Manufacturing Establishments (AR87-1)

This report presents data on exports by two- and three-digit SIC industry groups for the United States and States. Information is presented on value of direct report shipments and estimates of the employment required to manufacture these products. Included are estimates of employment in manufacturing and nonmanufacturing establishments that supply parts, materials, and services for production of manufactured exports.

Selected Characteristics of Manufacturing Establishments That Export (AR87-2)

This report presents data on the number of manufacturing companies and establishments that export by major group, State, employment size, and ratios of exports to shipments.

Indexes of Production (AR87-3)

The indexes presented in this report are designed to measure the change in physical output of each manufacturing and mineral industry between 1982 and 1987.

MICROFICHE

Every final published report in the 1987 Census of Manufactures will be available on microfiche.

PUBLIC-USE COMPUTER TAPES AND COMPACT DISCS

Data from the final industry series, geographic area series, and the Location of Manufacturing Plants report will be available on public-use computer tapes and compact discs-read only memory (CD-ROM). These tapes will provide the same information found in the final reports. Computerized data products are available for users who wish to summarize, rearrange, or process large amounts of data. These products, with corresponding technical documentation, are sold by Data User Services Division, Customer Services (Tapes), Bureau of the Census, Washington, DC 20233.

OTHER ECONOMIC CENSUSES REPORTS

Data on retail trade, wholesale trade, service industries, construction industries, mineral industries, transportation, enterprise statistics, minority-owned businesses, and women-owned businesses also are available from the 1987 Economic Censuses. A separate series of reports covers the censuses of outlying areas—Puerto Rico, Virgin Islands of the United States, Guam, and the Northern Mariana Islands. Separate announcements describing these reports are available free of charge from Data User Services Division, Customer Services (Publications), Bureau of the Census, Washington, DC 20233.

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